INSTRUCTION MANUAL

FOR THE

WJ-9206 SIGNAL MONITOR

INSTRUCTION MANUAL

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WJ-9206 SIGNAL MONITOR

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WARNING

This equipment utilizes voltages which are potentially dangerous and may be fatal if contacted. Exercise extreme caution when working with the equipment with any protective cover removed.

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WJ-9206 SIGNAL MONITOR INSTRUCTION MANUAL

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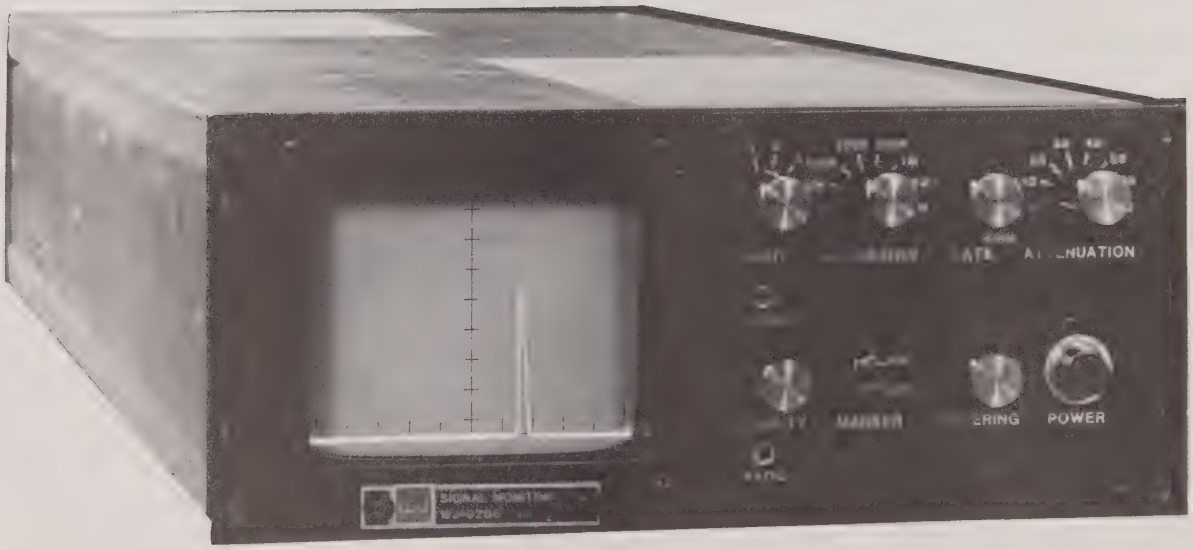


Figure 1-1. WJ-9206 Signal Monitor

SECTION I

GENERAL DESCRIPTION

1.1 GENERAL DESCRIPTION

The WJ-9206 Signal Monitor is a stand-alone unit, designed to operate with a 21.4 MHz IF, as used in WJ-8615 Receivers, which it matches in styling and performance. It may also be used with advantage with other receivers. The Monitor contains its own low and high voltage regulated power supplies, and will operate from 115 or 230 Vac through its fused input.

The Signal Monitor provides visual display of receiver spectrum within 2.5 MHz above and below the receiver tuned frequency, on its 4-inch (diagonal) CRT. An accurate logarithmic range of 60 dB is provided for signal display. Sweep width is selected in a 5-2-1 calibrated sequence, providing dispersions of 0 kHz to 5 MHz. The operator can select the optimum rate for any condition using the variable sweep rate control. Three different receivers may be connected to the Monitor, selectable from the Monitor front panel. (If receiver used is other than a WJ Model, see **paragraph 2.4.2**).

Two connectors are provided on the rear panel of the Signal Monitor which permit a large screen X - Y display monitor to be used with the WJ-9206.

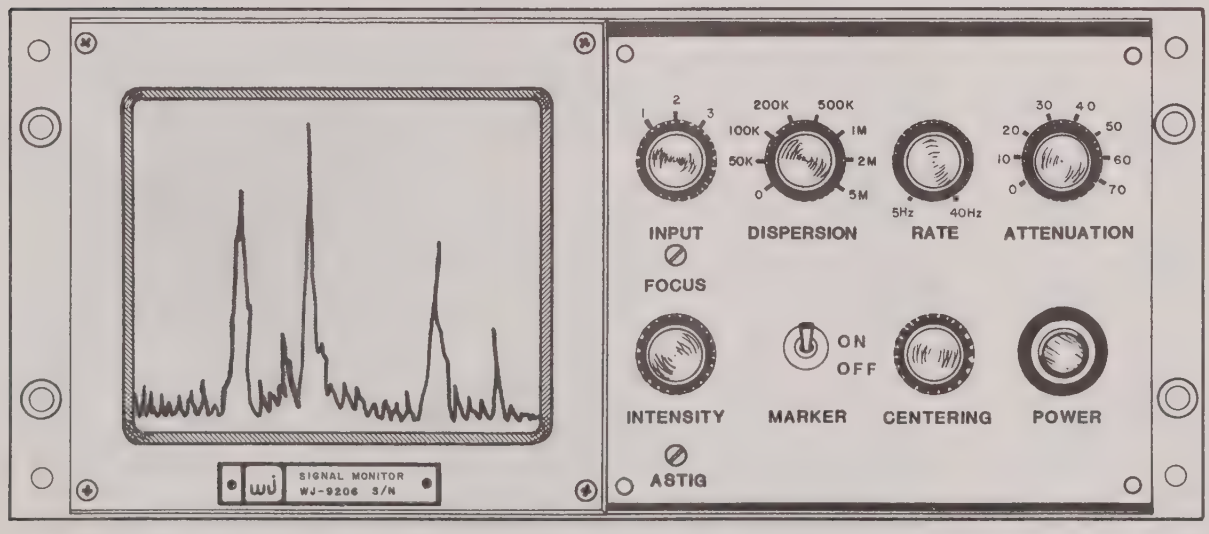


Figure 1-2. Front Panel of the WJ-9206 Signal Monitor.

1.2 MECHANICAL CHARACTERISTICS

The Signal Monitor mounts in a 3.5 inch half-rack panel. The main chassis top, bottom, front, rear and internal compartment panels are constructed of aluminum. With the exception of the ac input voltage selector switch, all switches, controls and indicators are on the front panel of the unit.

All front panel controls and switches are mounted to the front panel, with the exception of the Intensity control, which is mounted on a sub-assembly behind the panel. The unit requires 20 inches of depth in the rack and two of the Monitors can be housed side-by-side.

1.3 EQUIPMENT SUPPLIED

The equipment supplied consists of the Signal Monitor and detachable line cord. Additional equipment supplied includes an alignment tool and extender cables located inside the unit housing to permit troubleshooting and/or maintenance procedures.

1.4 EQUIPMENT REQUIRED BUT NOT SUPPLIED

To obtain full use of the Signal Monitor, one or more WJ-8615 receivers (or other 861X receivers), should be utilized. However, the Signal Monitor may be used with other manufacturers receivers, providing a pre-filtered 21.4 MHz IF signal is available. One coaxial cable with BNC connectors is needed for each 861X receiver connected to the Signal Monitor. Up to three (3) separate receivers are permitted. Specifications are given in **Table 1-1.**

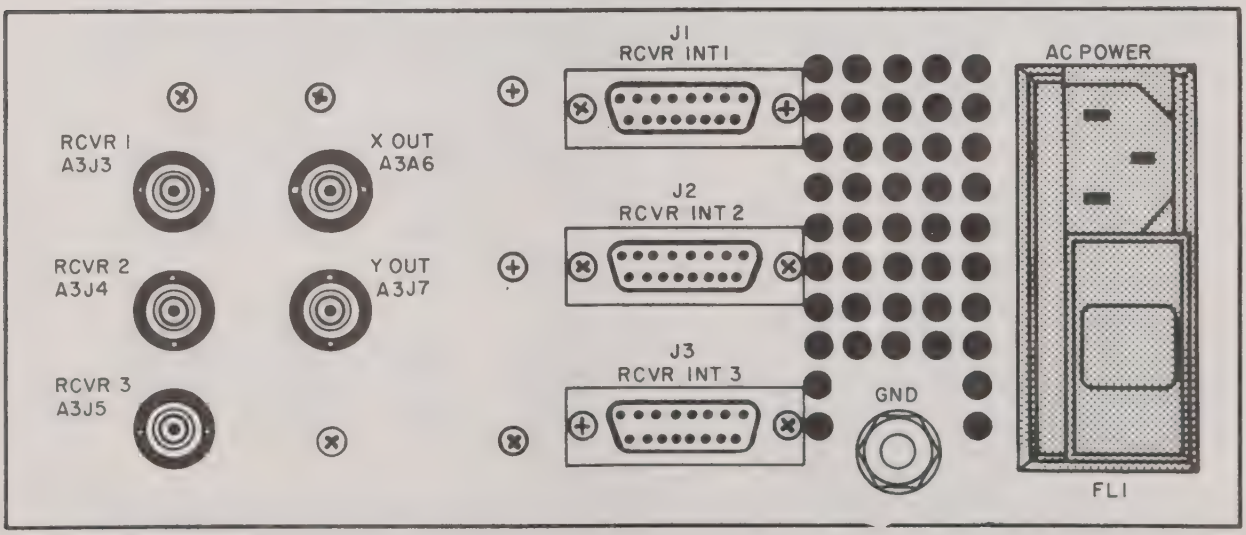


Figure 1-3. Rear Panel Connectors of WJ-9206 Signal Monitor.

In addition to the coaxial Receiver/Signal Monitor cable, a receiver interface connector is provided on the rear panel for each of the receivers to be connected. The DB-15 ribbon cable connector provides automatic spectrum inversion in the Signal Monitor to compensate for the spectrum inversion which occurs when a UHF Frequency Extender (FE) is being used. If the FE is not used, spectrum inversion is not required and the DB-15 cable may be omitted. If other than Watkins-Johnson receivers are used with the Signal Monitor, the signal connected must be TTL "LOW" for normal operation and TTL "HIGH" (3.5 - 5.0 volts), during inverted spectrum. (NOTE - With no input. The unit defaults to TTL HIGH)

Table 1-1. WJ-9206 Signal Monitor, Specifications

Cathode Ray Tube (CRT)	4-inch Diagonal Screen P-31 Phosphor Standard (Short Persistence) P-32 Phosphor Option (Medium Persistence)
Sweep Width	0 to 5 MHz (5-2-1 sequence)
Sweep Rate	5 to 40 Hz Variable (approximately)
Resolution Bandwidth	10 kHz, approximately
Input:	
Input Impedance	50 Ohms Nominal
Input Frequency	21.4 MHz
Input VSWR	1.5: 1 or less
Attenuator	0 - 70 dB nominal, 0 to 60 dB in
.....	10 dB steps
Display Range	70 dB logarithmic, ±2 dB
Marker	21.4 MHz Crystal Controlled
Input Supply Voltage	115 Vac or 230 Vac, 48-420 Hz, Approximately 38 Watts
Temperature Range:	
Operating	0°C to 50°C
Nonoperating	-20°C to 80°C
Weight	17 Pounds (7.71 kg)
Size	8.5 inches wide, (21.6 cm), 3.5 inches high, (8.9 cm), 20 inches deep, (50.8 cm)

Figure 1-4. Outline Drawing of the WJ-9206 Signal Monitor

SECTION II

INSTALLATION AND OPERATION

SECTION II

INSTALLATION AND OPERATION

2.1 UNPACKING AND INSPECTION

Examine the shipping carton for damage before unpacking equipment. If the carton exterior appears to be damaged, try to have the carrier's agent present during unpacking of the equipment. If this is not possible, retain all packing material and shipping containers for the carrier's inspection if damage to the equipment is evident after unpacking. Also, verify that the equipment supplied is as listed on the packing slip. Contact the Watkins-Johnson Company or your Watkins-Johnson representative if there is a discrepancy or shortage.

2.2 INSTALLATION

The WJ-9206 Signal Monitor is designed to mount in one half of a standard equipment rack and requires 3.5 inches of vertical rack space. Do not depend solely on the front panel mountings to support the unit. Use an approved type of slide, such as Jonathan Type QD110, or other hardware to support the Monitor in the equipment rack.

2.2.1 CONNECTOR SIGNALS

2.2.1.1 Line Cord Receptacle And Fuse Holder

Insert the female plug at the end of the separate line cord (supplied), into the male receptacle located on the rear panel of the monitor. Place the line voltage selector card in the position which matches the line voltage available, either 115 Vac or 230 Vac. The fuse holder is located on the rear panel, inside the power cord receptacle assembly. Make sure that it contains a .5 amp slo-blo fuse if 115 Vac is used, or .25 amp slo-blo if 230 Vac is used.

2.2.1.2 RCVR 1 (A3J3)

This BNC connector provides a 50 ohm input impedance to a 21.4 MHz IF signal from receiver #1, and is selected by position number 1 of the Input Selector Switch.

2.2.1.3 RCVR 2 (A3J4)

This BNC connector provides a 50 ohm input impedance to a 21.4 MHz IF signal from receiver #2, and is selected by position number 2 of the Input Selector Switch.

2.2.1.4 RCVR 3 (A3J5)

This BNC connector provides a 50 ohm input impedance to a 21.4 MHz IF signal from receiver #3, and is selected by position number 3 of the Input Selector Switch.

2.2.1.5 RCVR INT 1 Connector (J1)

This connector is used with a ribbon cable connecting Receiver #1 to the Signal Monitor. Note that this cable is in addition to the Receiver #1 Coaxial cable connected to Coax Connector, A3J3.

2.2.1.6 RCVR INT 2 Connector (J2)

This connector is used with a ribbon cable connecting Receiver #2 to the Signal Monitor. Note that this cable is in addition to the Receiver #2 Coaxial cable connected to Coax Connector, A3J4.

2.2.1.7 RCVR INT 3 Connector (J3)

This connector is used with a ribbon cable connecting Receiver #3 to the Signal Monitor. Note that this cable is in addition to the Receiver #3 Coaxial cable connected to coax Connector, A3J5.

2.2.1.8 "X" Display Connector (A3J6)

A3J6 is used to connect the "X" axis of the Signal Monitor display to a larger screen, if desired. The output is nominally -0.5 to +0.5 volts.

2.2.1.9 "Y" Display Connector (A3J7)

A3J7 is used to connect the "Y" axis of the Signal Monitor display to a larger screen, if desired. The output is nominally 0 to 0.8 volts.

2.3 EQUIPMENT MALFUNCTIONS

The WJ-9206 Signal Monitor was thoroughly inspected and tested prior to shipment. If malfunctions are encountered after following the recommended installation procedures, verify that the inter-unit cables are installed properly. If there still appears to be a problem with the equipment, contact your Watkins-Johnson representative or the Watkins-Johnson Company, CET Division, Gaithersburg, Maryland, to prevent possible warranty voiding prior to taking any corrective maintenance action.

2.4 OPERATION

The WJ-9206 Signal Monitor provides a visual indication of spectrum for the 21.4 MHz IF signals from one of three separate receivers. The various switches and controls used on the Monitor are discussed in the following paragraphs. **Table 2-1** lists the controls and indicators, while a detailed explanation of each will follow.

2.4.1 CONTROLS AND INDICATORS

Table 2-1. Table of Controls and Indicators

PUSH	Applies power to the Signal Monitor
INPUT	Selects Receiver 1, 2, or 3
DISPERSION	Selects Frequency Dispersion
RATE	Permits adjustment of the Sweep Rate
ATTENUATION	Selects the amount of Attenuation
INTENSITY	Adjusts CRT Trace Brightness
MARKER	Activates the Marker Signal
CENTERING	Adjusts Center Frequency
FOCUS	Permits proper focusing of CRT Trace
ASTIG	Adjusts for proper focusing of CRT Trace

2.4.1.2 Push ON/OFF Power Switch

This pushbutton switch applies power to the unit. When pressed, the button remains partially depressed, indicating that power has been applied to the unit. Pressing the button a second time removes the power from the unit and the button returns to the extended OFF position.

2.4.1.3 INPUT Selector Switch

This switch selects the receiver IF signal to be displayed on the CRT screen, from up to three (3) receivers. The numbers of the switch positions match the number of the BNC receptacles on the rear panel of the Signal Monitor. Thus the INPUT switch position "1" selects the INPUT from RCVR 1 (A3J3).

2.4.1.4 DISPERSION Selector Switch

The DISPERSION selector switch is used to select the frequency dispersion of the trace shown on the CRT display. The choices are:

0 kHZ
50 kHZ
100 kHZ
200 kHZ
500 kHZ
1 kHZ
2 kHZ
5 kHZ

2.4.1.5 RATE Control

This control is used to adjust the sweep rate of the horizontal scanning. This control may be set as desired, but should not be advanced beyond the point where the display signal shows a decrease in amplitude, if accurate log scale is required. The range from left to right, is 5 Hz to 40 Hz.

2.4.1.6 ATTENUATION Selector

The Attenuation Selector Switch provides attenuation of incoming signals (from the receiver selected by the INPUT Selector Switch), in 10 dB steps. Note that the attenuation is performed to the actual incoming signal, so the trace is also reduced in amplitude by the amount of attenuation selected. The ATTENUATION range available is:

0 dB
10 dB
20 dB
30 dB
40 dB
50 dB
60 dB
70 dB

2.4.1.7 INTENSITY Control

This control is used to adjust the intensity, or brightness of the CRT trace on the front of the tube. The INTENSITY may be adjusted to suit the operator.

2.4.1.8 MARKER Toggle Switch

The switch turns the 21.4 MHz MARKER signal ON and OFF.

2.4.1.9 CENTERING Control

The CENTERING control is used to move the trace displayed on the CRT face horizontally, to place the trace in the desired position on the screen. Normally the operator adjusts the displayed signal so that is is aligned in the center of the screen, using the MARKER signal as the 21.4 MHz center frequency.

2.4.1.10 FOCUS Control

The FOCUS control is recessed slightly below the front panel, and is designed to be adjusted by a small screwdriver or alignment tool. Very stable high voltage circuits are used with the Signal Monitor, therefore, adjustment of this control is very infrequent. Adjust the control as required to produce the sharpest trace.

2.4.1.11 ASTIGmatism Control

Like the FOCUS control, the ASTIGmatism control is also slightly recessed below the front panel. The need for this adjustment is also very infrequent. The ASTIG control is adjusted similar to the FOCUS control and adjusting it will produce the sharpest trace possible.

2.4.1.12 CRT Display

Notice that the screen of the CRT face indicates the vertical amplitude of any displayed signal in dB. The 10 dB steps are displayed on the screen graticule, from 0 to 70 dB.

2.4.2 INITIAL SETUP AND OPERATION

When using the Signal Monitor for the first time, the following setup order is suggested.

NOTE

If other than WJ equipment is being used, it may be necessary to correct the signal polarity from the other equipment. If the normal polarity of the control input is not TTL "LOW" for normal operation and TTL "HIGH" during inverted spectrum, proceed as outlined in **paragraph 2.4.2.1.** If only WJ Receivers are being used, skip steps A through D below and go to **paragraph 2.4.2.2.**

2.4.2.1 Setup Using Other Manufacturers Receivers Only

A. Locate the Sawtooth Generator printed circuit board (Type 796498-1). This card has three switches and a potentiometer mounted on it which extend through the front panel of the unit.

B. See **Figure 2-1** for a partial drawing of the component view of the printed circuit card, illustrating the jumper between wire-wrap terminals "A" & "B". (These terminals are located near connector J2, which is shown in **Figure 2-1**).

C. Carefully remove the jumper between Terminals "A" and "B", or cut the wire off and remove.

D. Wire-wrap an insulated jumper wire between terminals "B" and "C", as shown in **Figure 2-1.**

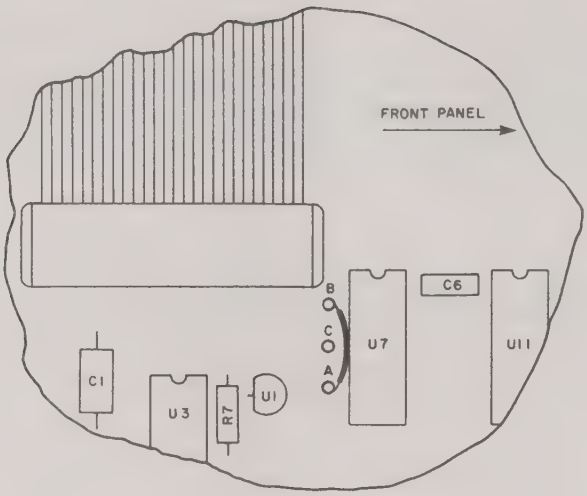


Figure 2-1. Normal/Invert Jumper Location on Sawtooth Generator, Type 796498-1

2.4.2.2 **Suggested First Setup of WJ-9206 Signal Monitor**

1. Check the ac input power selector card, to be sure that the switch setting and actual input ac line voltage are the same.

2. Look at the ac fuse. If the power source is 115 Vac, the fuse should be .5 amperes. If the power source is 230, the fuse should be .25 amperes.

3. Install the power cord.

4. Press the ac POWER switch, which will turn on the ac power to the Monitor.

5. Allow 30 or 40 seconds for the filament of the CRT to come to temperature and display a horizontal trace on the face of the CRT.

6. Adjust the INTENSITY control for the desired brightness of the trace.

7. Use the INPUT selector switch to connect the Monitor to the desired receiver, number 1, 2, or 3.

8. Select the signal amplitude desired on the CRT by using the ATTENUATION switch.

9. If desired, turn on the marker signal, by using the MARKER toggle switch, placing it in the "ON" position.

10. The brightness of the trace may be re-adjusted, if desired.

11. The signal(s) from the receiver (or Marker signal), can be moved to the center of the display area by using the CENTERING control.

12. Use the RATE control to adjust the sweep rate to the desired frequency. Do not increase the rate beyond the point that the displayed input signal amplitude begins to decrease, if accurate log display is required.

13. Se the DISPERSION selector switch for the amount of sweep of the display desired, from zero to 5 MHz.

14. (IF DEEMED NECESSARY)

    a. Adjust the Focus and Astigmatism as follows:

        1. Set the intensity of the trace to a "normal" brightness level.

        2. Using a small screwdriver, adjust the FOCUS control for the sharpest possible trace, particularly in the center.

        3. Again, using a small screwdriver, adjust the ASTIG control for the sharpest over-all trace possible.

NOTE

Repeat steps b and c as required; these controls (**FOCUS** and **ASTIG**) have slight interaction.

15. The controls may now be used as desired by the operator.

2.5 PREPARATION FOR RESHIPMENT

If the unit must be prepared for reshipment, the packaging method should follow the pattern established in the original shipment. If retained, the original materials can be reused to a large extent or as least provide guidance for the repackaging effort.

SECTION III

THEORY OF OPERATION

SECTION III

CIRCUIT DESCRIPTION

3.1 INTRODUCTION

The following paragraphs describe the theory of operation of the WJ-9206 Signal Monitor. A simplified block diagram is provided to show signal flow through the Signal Monitor. Functional block diagrams are provided for each of the modules along with the individual theory of operation of each module.

3.2 WJ-9206 FUNCTIONAL DESCRIPTION

The WJ-9206 Signal Monitor is designed to provide a spectrum display for monitoring and signal analysis for up to three receivers having a 21.4 MHz signal monitor output. The WJ-9206 Signal Monitor provides a visual display of the receiver spectrum within 2.5 MHz above and below the receiver tuned frequency. The following paragraphs describe the path a signal takes through the signal monitor. Refer to **Figure 3-1.**

The RF Circuit Assembly (A3) receives the 21.4 MHz RCVR Input signals from each of up to three receivers. These IF signals are directly connected to the Input Selector/Step Attenuator Module. The input signal to be processed is then selected, attenuated, and routed to the Input Filter/21.4 MHz Marker Assembly. The Input Filter/21.4 MHz Marker Assembly provides isolation and low-pass filtering of the selected input signal. The 21.4 MHz MARKER ENABLE is routed from the Sawtooth Generator when the marker switch is on. The input signal is then routed to the VCO/First Converter. The VCO SWEEP signal from the Sawtooth Generator is summed with the Vref before being applied to the VCO. After the selected input signal is mixed with the RF signal to produce the first IF signal, it is filtered and routed to the Second LO/Converter. The first IF signal is mixed with the second LO signal to produce the second IF signal. This second IF signal is then routed to the Second IF module. The second IF signal is filtered and amplified before being routed to the LOG IF/Detector. The BLANKING signal is routed from the Sawtooth Generator to the LOG IF/Detector. The Y OUTPUT (LOG VIDEO) signal from the LOG IF/Detector is routed through the Sawtooth Generator to the High Voltage Power Supply. The EXT-Y signal is routed directly to the rear panel connector, J7.

The Sawtooth Generator Assembly (A2) contains circuitry that generates two sweep signals, a VCO sweep signal, and two blanking signals used to process the display of the RF input signal. One sweep signal is routed to the High Power Supply/Video Assembly (A4), where it is used to generate the horizontal deflection voltages for the cathode ray tube (CRT). The second sweep signal is routed through the RF Circuit assembly and made available at the rear panel X-OUT connector (A3J6). The VCO sweep signal is used to control the voltage-controlled oscillator in the RF Assembly (A3). The blanking signals are routed to the RF Assembly (A3) and the High Voltage Supply/Video Assembly (A4) to interrupt respectively the vertical and horizontal components of the displayed signal trace momentarily while it returns to its starting place at the right side of the CRT. The Sawtooth Generator receives the log video signal from the RF Assembly (A3) and directly reroutes to the High Voltage Supply Video Assembly (A4).

The Sawtooth Generator is also the internal site of the DISPERSION, INPUT, RATE, MARKER, ATTENUATION, and CENTERING controls, which are accessible from the front panel. The position of these mechanical controls are converted into electronic signals that are used to control how the input signal is selected and processed for display.

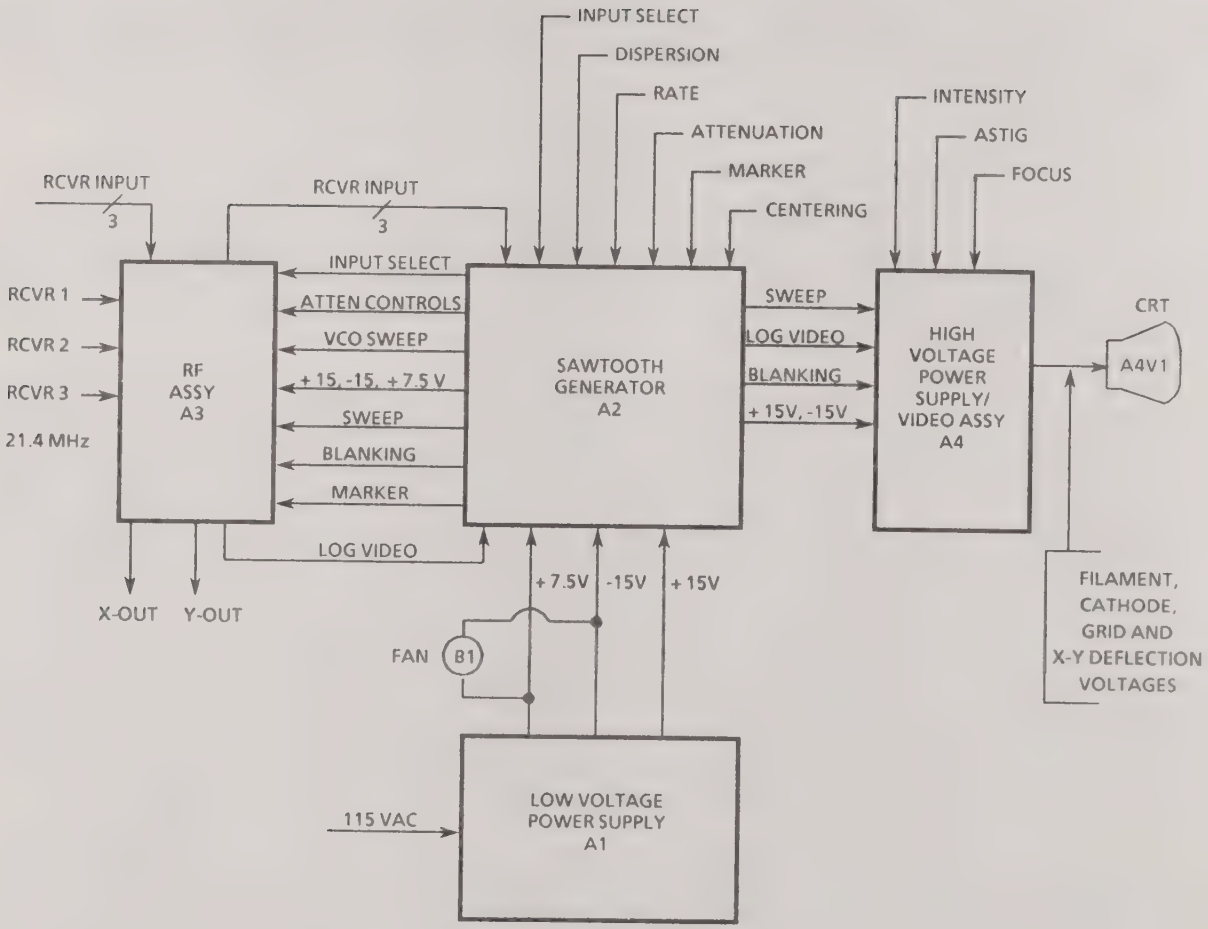


Figure 3-1. WJ-9206 Functional Block Diagram

The High Voltage Power Supply/Video assembly (A4) provides the voltages required to operate the CRT (Cathode Ray Tube). Voltages provided by the High Voltage Power Supply include the filament voltage, the cathode voltage, the acceleration voltage, and horizontal and vertical deflection voltages.

The Low Voltage Power Supply (A1) provides the supply voltages used by the other signal monitor assemblies. These voltages are +8V, +15V, and -15V.

3.3 CIRCUIT DESCRIPTION

The following paragraphs provide more detailed information on the operating circuitry of the modules in the WJ-9206 Signal Monitor.

3.3.1 RF CIRCUIT ASSEMBLY, A3

The following paragraphs describe the modules that comprise the RF Circuit Assembly (A3), Type 796499-1, of the WJ-9206 Signal Monitor. Refer to **Figure 3-2** for a block diagram of the RF Circuit Assembly.

The 21.4 MHz IF signal from each WJ-8615 Receiver is connected to one of the three BNC connectors (A3A1J1-A3A1J3) on the signal monitor rear panel. Signals at these connectors are directly connected to the Input Selector/Step Attenuator Module (A3A1) of the RF Circuit Assembly (A3). This module determines which input signal is to be processed. The selected signal can also be attenuated from 0 dB to 70 dB (selectable in 10 dB steps) before being applied to the Input Filter/21.4 MHz Marker Assembly (A3A2).

The Input Filter/21.4 MHz Marker Assembly (A3A2) provides isolation and low-pass filtering of the selected input signal. From the Input Filter, the signal is directed to the VCO/First Converter (A3A3). The input signal is applied to E5 terminal of the VCO/First Converter module (A3A3). This unit mixes the RF signal from the Input Filter (A3A2) with the 118.1 MHz first LO to produce the 96.7 MHz first IF. The first IF is bandpass filtered before being applied to the Second LO/Converter (A3A4). The Second LO/Converter low-pass filters the first IF signal before it is mixed with the second LO signal of 86 MHz to produce the 10.7 MHz second IF.

The 10.7 MHz Second IF signal is routed to the Second IF module (A3A5). This module bandpass filters the 10.7 MHz second IF signal before amplifying the IF signal. After amplification, the second IF is again routed through a bandpass filter which provides the video resolution bandwidth before routing the output signal to the LOG IF/Detector (A3A6). The post filtered 10.7 MHz second IF signals are again low-pass filtered before being buffered and applied to the successive detector network. The output from the successive detector network is amplified and applied to the LOG amplifier. The output voltage (0 to 5 Vdc) from the LOG Amplifier is applied to the Sawtooth Generator (A2) via the Interface Circuit Board (A3A7).

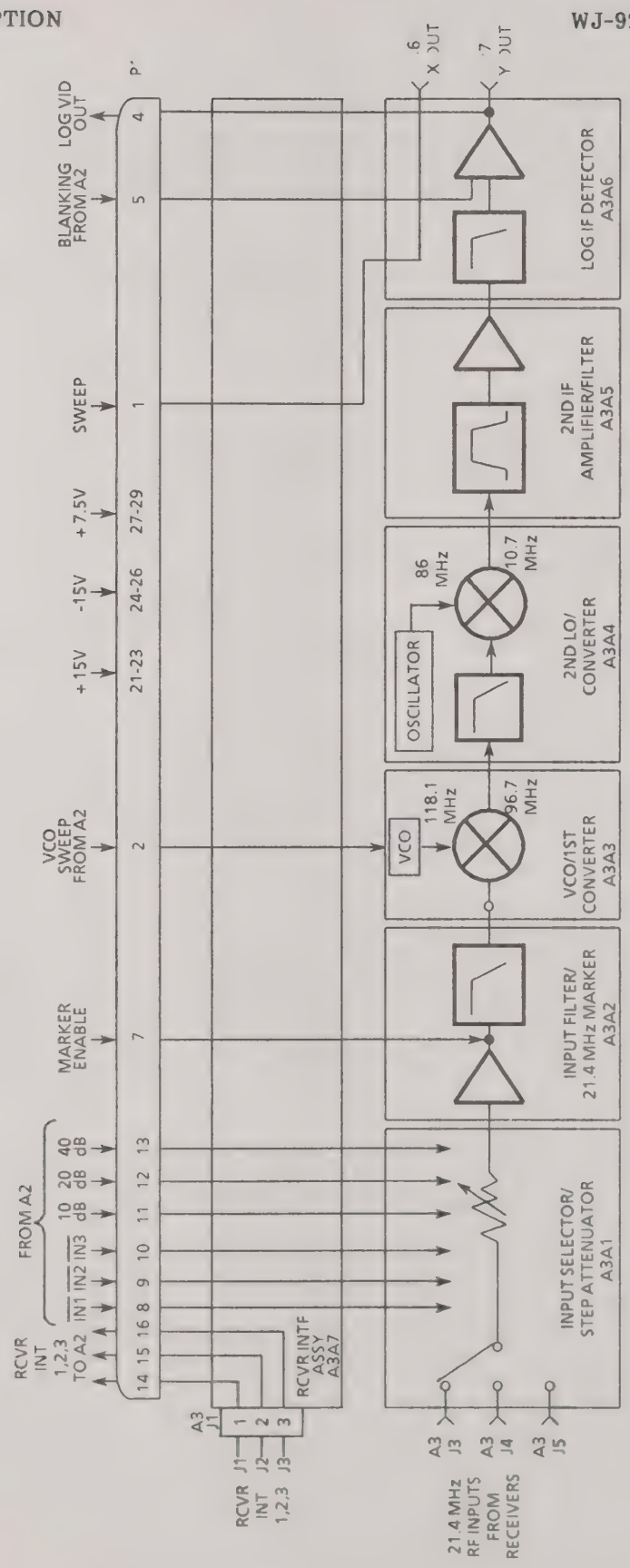


Figure 3-2. RF Circuit Assembly (A3) Block Diagram

3.3.1.1 Input Selector/Step Attenuator, A3A1

The Input Selector/Step Attenuator (A3A1), Type 796500-1, selects the input signal source from the three receiver IF signals which are connected to the rear panel connectors A3J3, A3J4, and A3J5. The input is selected by diode switches which are controlled by the IN1*, IN2*, and IN3* signals from the Sawtooth Generator, A2 via Interface Circuit Board (A3A7). A3A1 also provides from 0 to 70 dB of attenuation via A3A7 of the received signal as selected by the operator and determined by signals 10 dB, 20 dB, and 40 dB that are sent to the Input Selector/Step Attenuator via A3A7 from the Sawtooth Generator. The output signal from the Input Selector/Step Attenuator is applied to the Input Filter/21.4 Marker module (A3A2).

The 21.4 MHz IF signals from the rear panel connectors (A3J3-A3J5) are capacitively coupled to a diode switching network. As shown on the block diagram (**Figure 3-3**), the input selection is controlled by signals IN1* thru IN3.* For example, to select RCVR1 (A3J3), a low logic level is applied to the input (terminal E7). Refer to the following list for the INPUT selection.

Input Selection	E# of Input	Voltage Levels		
		IN1(E7)	IN2(E6)	IN3(E5)
RCV R1 (A3J3)	E11	L	H	H
RCV R2 (A3J4)	E12	H	L	H
RCV R3 (A3J5)	E13	H	H	L

L = 0 Vdc; H = ±5 Vdc

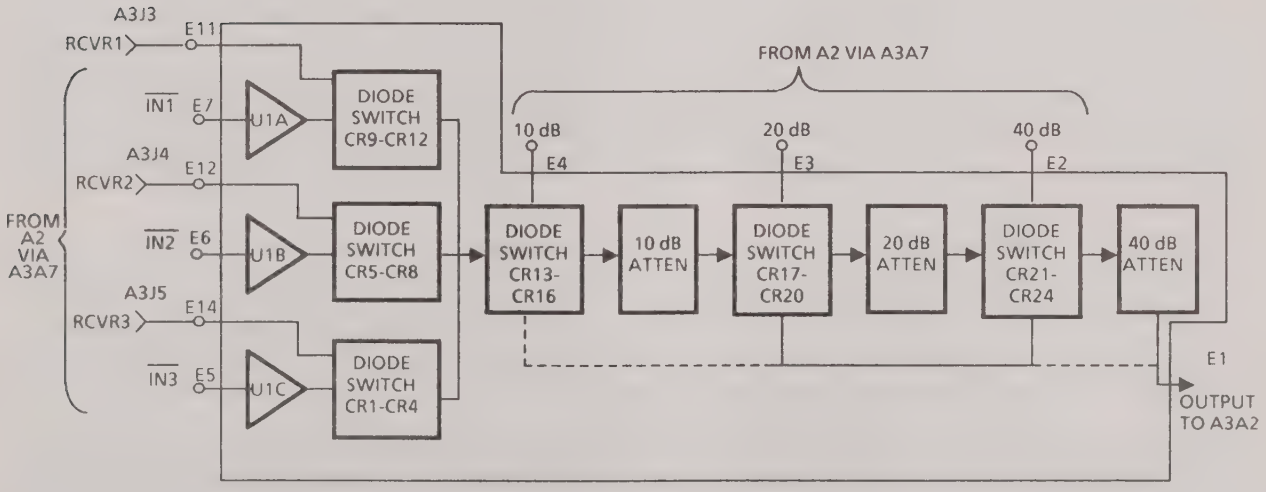


Figure 3-3. Input Selector/Step Attenuator (A3A1) Block Diagram

The selected input is coupled by capacitor C29 to a three-step attenuation circuit. The attenuation circuits are switched in or out by the 10 dB (E4), 20 dB (E3), and 40 dB (E2) control signals. As shown in **Figure 3-2**, the 10 dB signal at E4 is used to switch the 10 dB attenuation circuit. A logic low (0 Vdc) at E4 bypasses the attenuation resistor network and when E4 is high (+15 Vdc), the RF input is routed through the 10 dB attenuator. When E3 is low (0 Vdc), the 20 dB attenuation network is bypassed and when E3 is high (+15 Vdc), the input signal is routed through the 20 dB attenuator. When E2 is low (0 Vdc), the 40 dB attenuation network is bypassed and when E2 is high (+15 Vdc), the input signal is routed through the 40 dB attenuator. The following list indicates the logic levels required to select attenuation levels from 10 dB to 70 dB.

Attenuation (in dB)	Logic Levels		
	10 dB E4	20 dB E3	40 dB E2
0	L	L	L
10	H	L	L
20	L	H	L
30	H	H	L
40	L	L	H
50	H	L	H
60	L	H	H
70	H	H	H

L - 0 Vdc; H = +15 Vdc

U2A compares the +15 Vdc signal at its inverting input with the 2.5 Vdc reference voltage at its non-inverting input. The resulting -B.5 Vdc output isolates the RF signal from the bypass to the 10 dB resistor network. U2D compares the +15 Vdc signal at its non-inverting input with the 2.5 Vdc reference voltage at its inverting input. The resulting +B.5 Vdc output routes the RF signal through the 10 dB resistor network. A logic low (0 Vdc) signal at E4 causes comparator U2A to output a positive voltage which selects the bypass path and causes comparator U2D to output a negative voltage which isolates the RF signal from the 10 dB attenuator network.

Whether attenuated or not, the selected INPUT signal is routed from the Input Select/Step Attenuator Assembly at terminal E1 to the Input Filter/21.4 MHz Marker Assembly (A3A2) terminal at E5.

3.3.1.2 Input Filter/21.4 MHz Marker, A3A2

The Input Filter/21.4 MHz Marker Assembly (A3A2), Type 796501-2, consists of an isolation amp, a low-pass filter, and a marker enable circuit. The selected IF signals from the Input Select/Step Attenuator are applied to the Input Filter which provides low pass filtering of the received input signal. The filtered 21.4 MHz is then routed to the VCO/First Converter (A3A3). Refer to **Figure 3-4** for a block diagram of the Input Filter/21.4 Marker.

The input signal at terminal E5 is capacitively coupled to isolation, buffer amplifiers Q2 and Q3 before being applied to the primary of transformer T1. Signals from the secondary of T1 are low pass filtered before being routed through terminal E1 to the VCO/First Converter (A3A3).

The MARKER ENABLE signal is routed from the Sawtooth Generator (A2) only when the marker switch on the front panel is activated (ON). The MARKER ENABLE signal activates the 21.4 MHz oscillator, Y1, on the Input Filter/21.4 Marker board, which results in a pip on the CRT screen. This resulting pip represents the center of the signal monitor response.

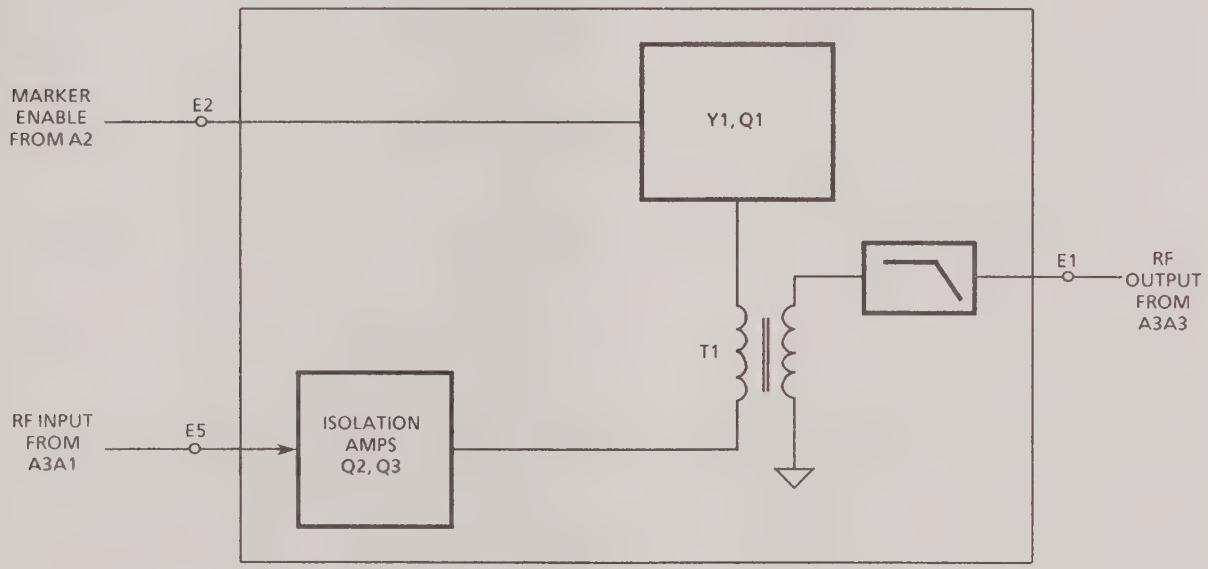


Figure 3-4. Input Filter/21.4 Marker (A3A2) Block Diagram

3.3.1.3 VCO/First Converter, A3A3

The VCO/First Converter mixes the RF signal received from the Input Filter/21.4 MHz Marker with the 118.1 MHz ±2.5 MHz signal from the transmission line oscillator. The result is a 96.7 MHz First IF signal which is output at terminal E4 for routing to the Second LO/Converter.

As shown on the block diagram, **Figure 3-5** the 21.4 MHz signal from the Input Filter/21.4 MHz Marker is applied directly as one of the inputs to the mixer in the VCO/First Converter module A3A3. The other input to the mixer is a local oscillator of 118.1 MHz (± 2.5 MHz).

A reference voltage (Vref) is generated by U1, Q1, and Q2. This voltage sets the starting frequency and linearity of the VCO. The sweep control signal is derived by summing the sweep input signal received from the Sawtooth Generator (A2) with the Vref and applying this to the VCO. The VCO is composed of varactor diodes (CR3 and CR4), a transmission line (Z1), and a transistor (Q3).

The 118.1 ±2.5 MHz First LO frequency is mixed with the 21.4 MHz RF IN signal from the Input Filter/21.4 MHz Marker, A3A2. This mixing produces a 96.7 MHz First IF signal. The IF signal is then amplified and output at terminal E4 for routing through a bandpass filter to the Second LO/Converter, A3A4.

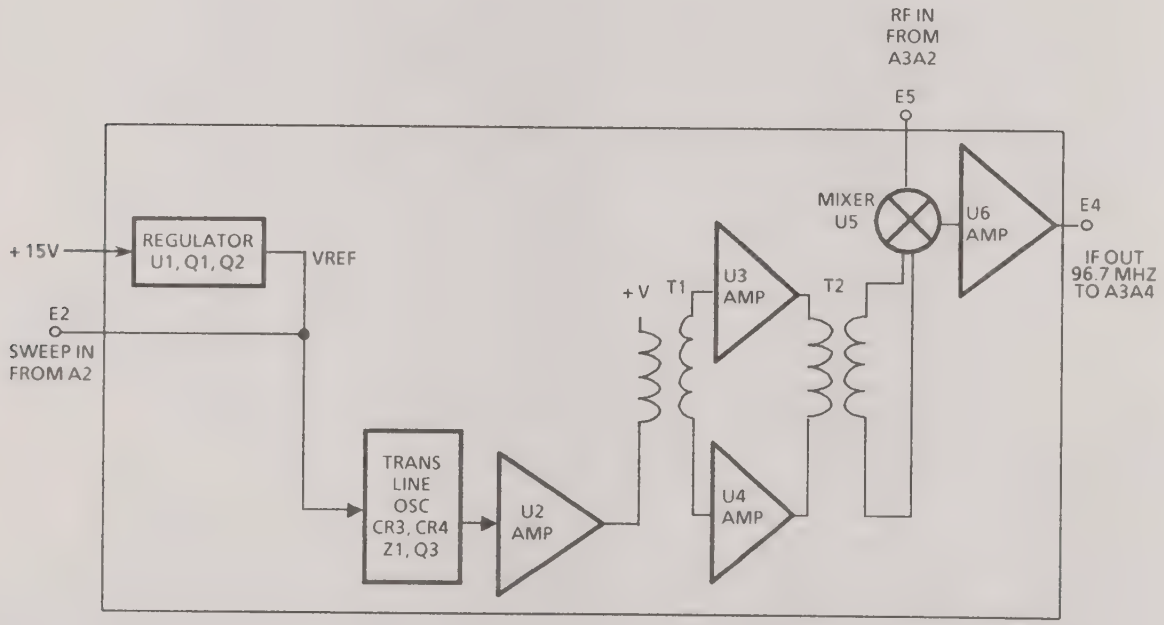


Figure 3-5. VCO/First Converter (A3A3) Block Diagram

3.3.1.4 Second LO/Converter, A3A4

The 96.7 MHz First IF signal from the VCO/First Converter is routed through a bandpass filter before being applied to the input terminal, E4, of the Second LO/Converter, A3A4. The First IF signal is mixed with an 86 MHz signal to produce a 10.7 MHz Second LO output. Refer to **Figure 3-6** for a block diagram of the Second LO/Converter module.

The 96.7 MHz First IF is coupled to the Second LO/Converter (A3A4) where it is low pass filtered and applied as one input to the mixer, U4. The other input to this mixer is the 86 MHz from the crystal-controlled Second LO. The resulting 10.7 MHz Second IF signal from the mixer is output at terminal E3 and applied to the Second IF module (A3A5).

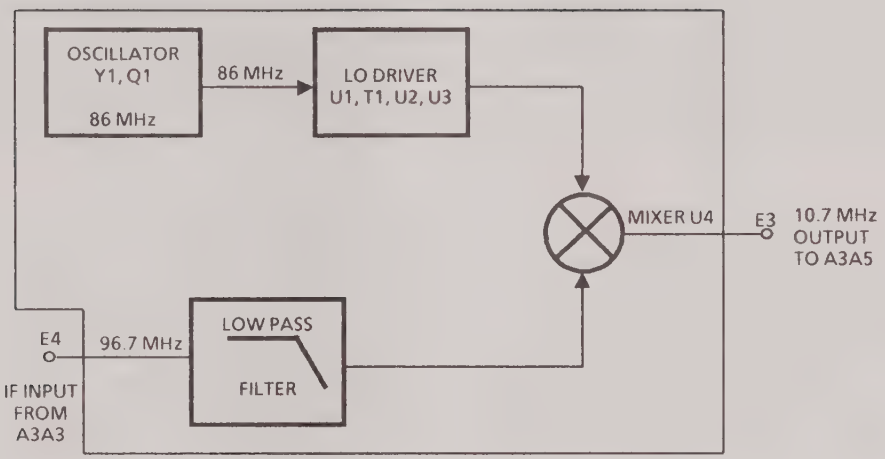


Figure 3-6. Second LO/Converter (A3A4) Block Diagram

3.3.1.5 Second IF Assembly, A3A5

Refer to **Figure 3-7.** The pre-filtered 10.7 MHz signal is received from the Second LO/Converter (A3A4) at terminal E4. This 10.7 MHz signal is filtered in the Second IF module (A3A5). The post-filtered 10.7 MHz signal is output at terminal E1 and then directed to the LOG IF Amplifier/Detector (A3A6).

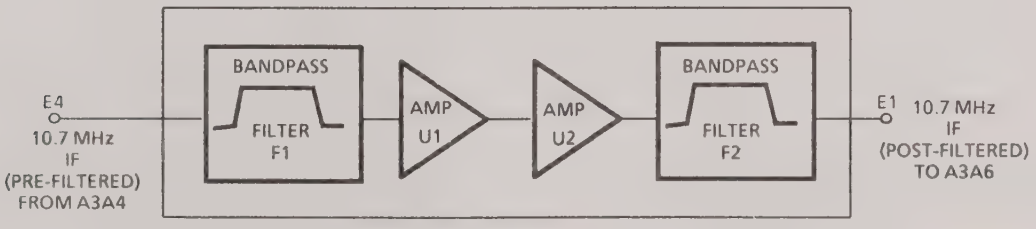


Figure 3-7. Second IF Assembly (A3A5) Block Diagram

3.3.1.6 LOG IF Amplifier/Detector, A3A6

The 10.7 MHz IF signal from the Second IF Module (A3A5) is routed to the LOG IF Amplifier/Detector (A3A6) where it is post-filtered, amplified, and applied to the LOG Amplifier. The output voltage from the LOG IF Amplifier/Detector Module is a voltage from 0 to approximately 5 volts. This Y output is routed through the Sawtooth Generator (A2) to the High Voltage Power Supply (A4) to generate the video for the vertical deflection of the sweep trace. Refer to **Figure 3-8.**

The post-filtered 10.7 MHz IF signal is applied to the LOG IF/Detector at terminal E1. The IF signal is low pass filtered before being buffered by Q1 and applied to the successive detectors, U1-U7. Each successive detector provides approximately 11 dB of gain control before saturating. All of the detectors combined provide more than 77 dB of gain range. The RF output of each stage is coupled to the input of the next stage. The detected outputs are tied together and applied to the summer/amplifier circuit (U8 and U9). The output voltage of U9B is applied to terminal E7 as the Y OUTPUT. This output voltage is from 0 to approximately 5 Vdc and is determined by the input signal level. The output voltage from the successive detectors is also applied to the linearizer and is directed through U9A. The output voltage of U9A is applied to terminal E8 as the EXT Y signal.

The Y OUTPUT signal is passed through the Interface Circuit Board (A3A7) and then applied to the Sawtooth Generator as the LOG VIDEO OUT signal. The EXT Y signal is routed directly to the rear panel connector, J7.

A blanking signal received from the Sawtooth Generator, A2, via the Interface Circuit board is used to disable the log output during the period that the monitor's trace is being repositioned to its start point on the left side.

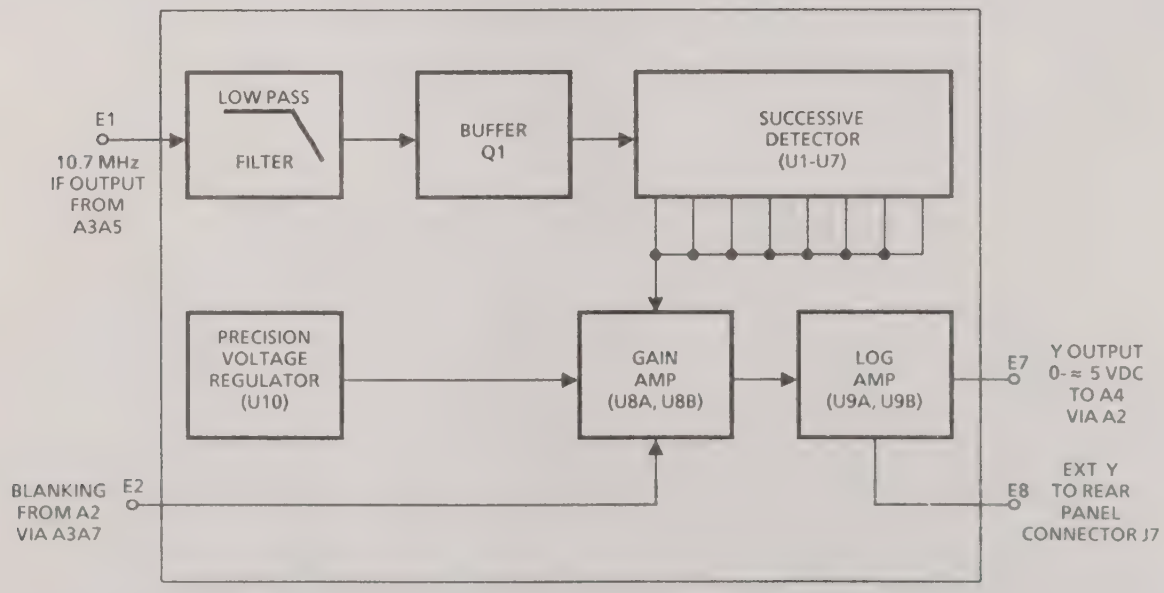


Figure 3-8. LOG IF/Detector (A3A6) Block Diagram

3.3.1.7 Interface Circuit Board, A3A7

Signal monitor data and control signals pass through the Interface Circuit Board (A3A7). The Interface Circuit Board provides the interface between the different modules. Signals passing through the Interface Circuit Board include the INTERFACE 1, INTERFACE 2, INTERFACE 3, IN1*, IN2*, IN3*, MARKER ENABLE, VCO SWEEP, LOG VIDEO OUT, BLANKING, SWEEP, input attenuation control signals and various DC voltages.

3.3.2 SAWTOOTH GENERATOR, A2

The Sawtooth Generator Assembly (A2) contains circuitry that generates two sweep signals, a VCO sweep signal, and two blanking signals used to process the display of the RF input signal. See **Figure 3-9.** One sweep signal is routed to the High Power Supply/Video Assembly (A4), where it is used to generate the horizontal deflection voltages for the cathode ray tube (CRT). The second sweep signal is routed through the RF Circuit assembly and made available at the rear panel X-OUT connector (A3J6). The VCO sweep signal is used to control the voltage-controlled oscillator in the RF Assembly (A3). The blanking signals are routed to the RF Assembly (A3) and the High Voltage Supply/Video Assembly (A4) to interrupt respectively the vertical and horizontal components of the displayed signal trace momentarily while it returns to its starting place at the right side of the CRT. The Sawtooth Generator receives the log video signal from the RF Assembly (A3) and directly reroutes to the High Voltage Supply Video Assembly (A4).

The Sawtooth Generator is also the internal site of the DISPERSION, INPUT, RATE, MARKER, ATTENUATION, and CENTERING controls, which are accessible from the front panel. The position of these mechanical controls are converted into electronic signals that are used to control how the input signal is selected and processed for display.

The Sawtooth Generator receives the Receiver Interface signals (RCVR INTF 1, RCVR INTF 2, and RCVR INTF 3) from the rear panel connectors, J1, J2, J3, via the Interface Circuit Board (A3A7). Refer to **Figure 3-9.** The front panel INPUT switch selects which receiver input is active. The INPUT switch signals are ORed together with their respective Receiver Interface signals. The resulting signal is then routed to switch U6 through the inverting/non-inverting circuit of U7A and U7C. When a selected receiver line is pulled low by input switch S2, the spectrum is inverted.

The RATE control potentiometer, A2R5, is used to control how often trigger pulses are received by a one-shot multivibrator, U5. U5 provides an output pulse which is used as blanking signals, two sweep signals, and the VCO sweep signal.

The CENTERING control, A2R34, is used to vary the positioning of the horizontal sweep. A2R34 controls an offset voltage applied to U12, which serves to position the horizontal trace to the right or left.

The front panel DISPERSION switch varies the frequency span represented by the displayed horizontal trace. This switch determines the resistor network in which the sweep signal from U4A is routed. The sweep signal is then routed through the spectrum inversion circuit, U4C and U4D. The resulting signal is then routed to switch U6. The signal received from U7A and U7C determines whether inverted or upright signal is routed to buffer U12. The signal is then buffered with the front panel CENTERING control signal before being routed to the VCO/First Converter, A3A3.

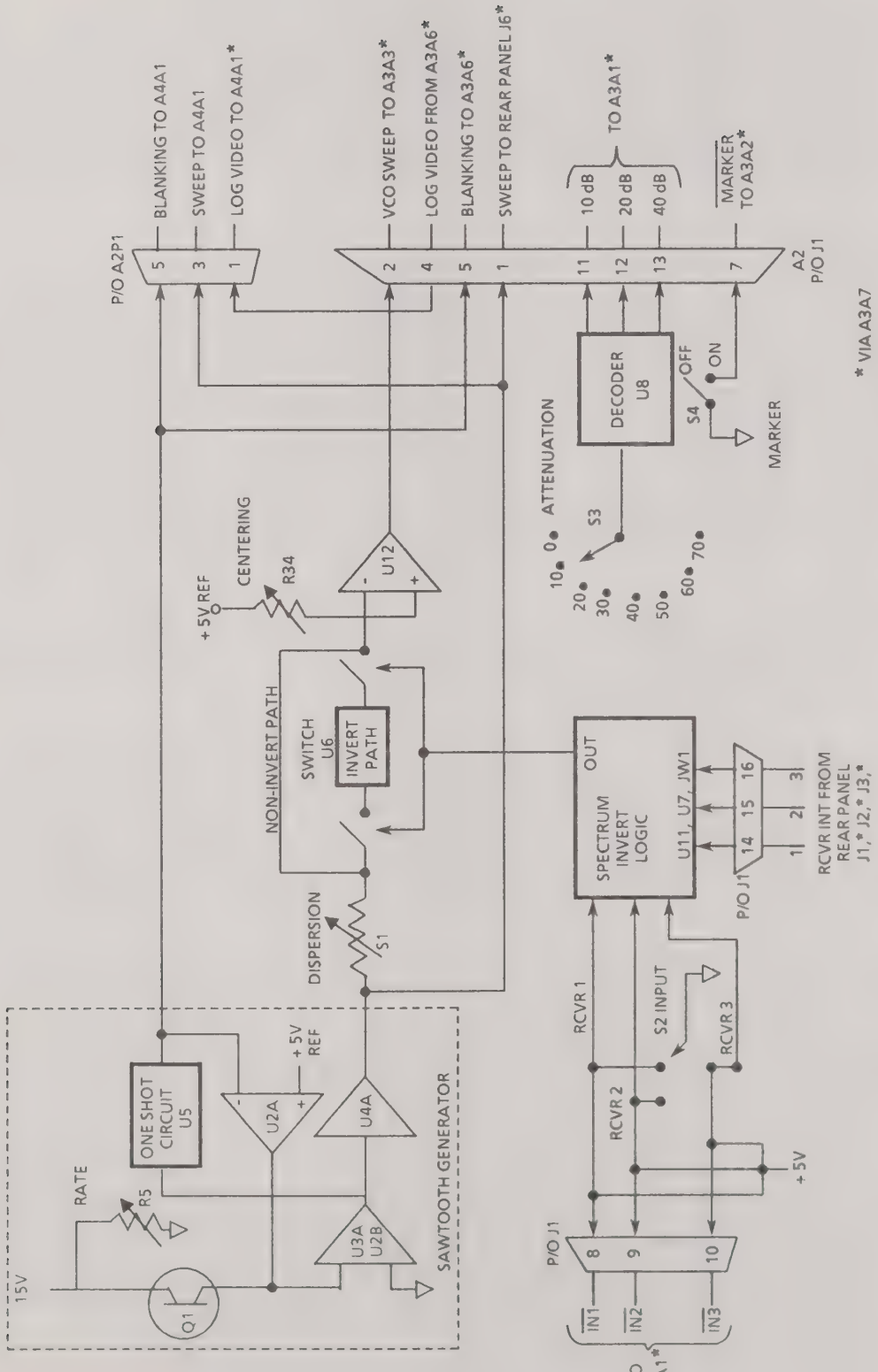


Figure 3-9. Sawtooth Generator (A2) Block Diagram

The front panel ATTENUATOR switch control signals are routed to encoder U8. Based upon the switch setting, the 10 dB, 20 dB, or 40 dB lines to the Input Selector/Step Attenuator (A3A1) are set to an active high logic level (+15 Vdc).

The front panel MARKER switch controls whether the marker is turned on or off. When the marker switch is activated, a logic low to sent through J1, pin 7, to the Input Filter/21.4 MHz Marker (A3A2).

The Log Video signal is routed from the Log IF/Detector to the High Voltage Power Supply/Video.

3.3.3 HIGH VOLTAGE POWER SUPPLY/VIDEO ASSEMBLY, A4

The High Voltage Power Supply/Video Assembly (A4), Type 796799-1, contains the Type 796507-1 High Voltage Power Supply/Deflection Amplifier (A4A1), and the Type 481445-1 CRT.

3.3.3.1 High Voltage Power Supply/Deflection Amplifier, A4A1

The Type 796507-1 High Voltage Power Supply/Deflection Amplifier (A4A1), which is shown schematically in **Figure 6-11**, contains the horizontal and vertical amplifiers and the high voltage power supply. These circuits develop the operational voltages needed to produce the trace on the CRT. Refer to **Figure 3-10**.

The LOG VIDEO (Y) and the BLANKING signals, received from the Sawtooth Generator A2, are applied to a vertical deflection amplifier and drive the CRT plates to produce the vertical coordinates of the trace. At the same time, the SWEEP (X) signal, also received from the Sawtooth Generator A2, is applied to a horizontal deflection amplifier and drives the CRT plates to produce the horizontal sweep.

The INTENSITY, FOCUS, and ASTIG front panel adjustments control the trace display on the CRT. The INTENSITY adjustment affects the Cathode voltage applied to the CRT. The FOCUS adjustment affects the Acceleration voltage applied to the CRT. The ASTIG adjustment affects the Anode voltage applied to the CRT.

The High Voltage power supply produces the 220 Vdc required by the horizontal and vertical output amplifiers. A 500 Vdc output from the power supply circuit is applied to a quadrupler to produce the 2000 Vdc high voltage and the focus voltages for the CRT.

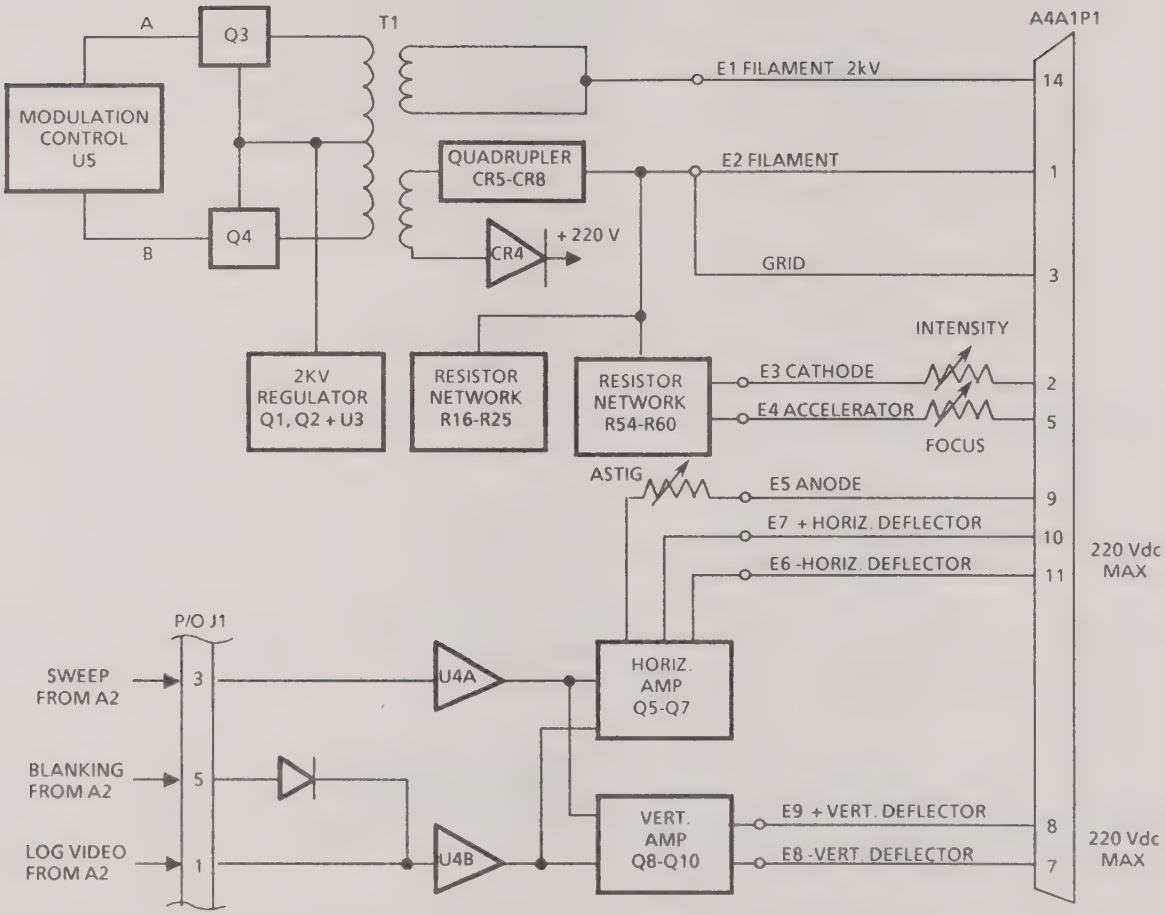


Figure 3-10. High Voltage Power Supply (A4A1) Block Diagram

3.3.4 LOW VOLTAGE POWER SUPPLY, A1

The Low Voltage Power Supply (A1), Type 796497-1, which is shown schematically in **Figure 6-1**, is comprised of a full-wave bridge rectifier, a half-wave rectifier, and three voltage regulators. It supplies +15V, -15V, and +8V operating voltages to both the analog and digital circuits of the signal monitor. Refer to **Figure 3-11** during this discussion.

Input ac power is applied through the line filter, power switch, voltage selector switch, and power transformer. The voltage selector switch is set to either the 115 Vac or 230 Vac position depending on the line voltage used. It adapts the connections made to the primary of the step-down power transformer.

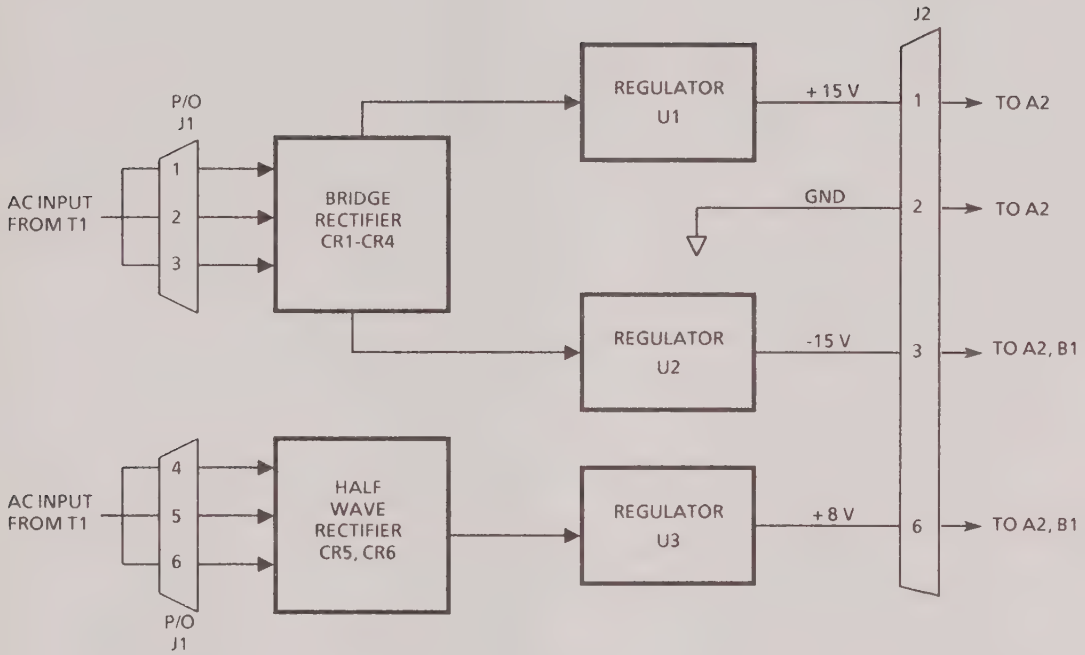


Figure 3-11. Low Voltage Power Supply (A1) Block Diagram

One of the two secondary windings of the transformer supplies the ac voltage to the full-wave bridge rectifier. Both negative and positive rectified output voltages are provided. The positive voltage is filtered and input to the +15 Vdc regulator, U1. The regulated +15 Vdc is routed to the signal monitor circuits through the power supply connector J2, pin 1. The negative output from the bridge rectifier is filtered and input to the -15 Vdc regulator, U2. The regulated -15 Vdc is routed to the signal monitor circuits through the power supply connector J2, pin 3.

The other secondary winding of the transformer supplies the ac voltage to the half-wave rectifiers. The positive voltage from the rectifier is filtered and applied to the voltage regulator, U3. The regulated +8 volt output from the regulator is routed through connector J2, pin 6.

The Low Voltage Power Supply signals are connected to the Sawtooth Generator, A2, through the A2P2 connector.

SECTION IV

MAINTENANCE

SECTION IV

MAINTENANCE

4.1 GENERAL

The WJ-9206 Signal Monitor has been designed to operate for extended periods of time with a minimum of routine maintenance. Cleaning, inspection, and performance tests should be performed at regular intervals, consistent with the facility's normal maintenance scheduling and after repairs have been completed.

4.2 CLEANING AND LUBRICATION

The unit should be kept free of dust, moisture, grease, and other foreign material to ensure trouble-free operation. Low pressure air can be used, if available, to remove accumulated dust from the interior of the unit. A clean, dry cloth or soft bristle brush may also be used to remove the accumulation of dust. No lubrication of this unit is required.

4.3 INSPECTION FOR DAMAGE OR WEAR

Many existing or potential troubles can be detected by making a thorough visual inspection of the unit. For this reason, as a first step, a complete visual inspection should be made whenever the unit is inoperative. Inspect mechanical parts, such as pin connectors, and interconnecting cables for looseness, wear, and signs of deterioration. Electrical components that show visible signs of deterioration, such as overheating, discoloration, or "sweating" should be carefully checked for proper operation. In addition, a thorough inspection of the associated circuitry should be made to verify proper operation. Often times, damage due to overheating is the result of other, less apparent problems in the circuit.

4.4 TEST EQUIPMENT REQUIRED

The test equipment listed in **Table 4-1**, or equivalent is required to perform the following troubleshooting procedures, performance tests, and alignment procedures.

Table 4-1. Test Equipment Required

Equipment	Description	Type
Autotransformer	Variable	W5MT3W General Radio
Digital Voltmeter	High Impedance	8050A Fluke
Signal Generator	20 Hz-1024 MHz	8640B Hewlett-Packard
Spectrum Analyzer	100 Hz-1.5 GHz	8568B Hewlett-Packard
Oscilloscope	100 MHz Dual Trace	465B Tektronix
AC Power Source	45 Hz-10 kHz	400V Elgar
Volt/Power Meter	Volt/Ammeter	501A Elgar

4.5 TROUBLESHOOTING AND FAULT ISOLATION PROCEDURES

Troubleshooting of this unit can be performed by placing the unit in its normal operating mode and observing its operation during various operating conditions. The following performance tests, and the Troubleshooting Table (**Table 4-2**) are provided as an aid for localizing the cause of a malfunction to a particular subassembly or module within the unit. Refer to the block diagrams in **Section III** and the schematic diagrams in **Section VI** of this manual to aid in the troubleshooting.

WARNING

This equipment utilizes voltages which are potentially dangerous and may be fatal if contacted. Exercise extreme caution when working with the equipment with any protective cover removed.

CAUTION

To prevent possible damage to the unit circuitry, turn power OFF before removing or installing any subassembly or module.

Table 4-2. WJ-9206 Troubleshooting Table

Symptom	Probable Cause	Corrective Action
Unit totally inoperative. No display or output.	Fuse F1 blown	Locate and correct cause of blown fuse. Replace blown fuse.
	Defective power switch	Verify proper operation of switch, S1. Replace if defective.
	Failed Low Voltage Power Supply (A1)	Refer to **paragraph 4.6.1.**
Display dim	Set for 230 Vac operation with 115 Vac applied to the unit.	Set voltage selector switch for proper line voltage.
No display on CRT	Faulty VCO/1st Converter (A3A3)	Verify proper operation of A3A3.
	Defective High Voltage Power Supply (A4)	Verify proper operation of A4.
	Faulty CRT	Verify proper CRT operation.
	Unconnected input	Connect and select desired input.

Table 4-2. WJ-9206 Troubleshooting Table (Continued)

Symptom	Probable Cause	Corrective Action
Signal amplitude is nonlinear	Faulty Log/IF Detector (A3A6)	Verify proper LOG/IF operation. Refer to **paragraph 4.6.6.**
Unable to select different inputs	Defective Input Selector/Step Attenuator (A3A1)	Refer to **paragraph 4.6.5.**
Attenuation inoperative	Defective Input Selector/Step Attenuator (A3A1)	Refer to **paragraph 4.6.7.**

4.6 PERFORMANCE TESTS

The following performance test procedures may be used for periodic performance testing, as an aid in troubleshooting, or as a unit performance test after repairs have been completed. These procedures should be performed only by skilled technicians familiar with the unit and with the tests being performed.

4.6.1 LOW VOLTAGE POWER SUPPLY PERFORMANCE TEST

NOTE

The input voltage is selected by positioning a printed circuit (PC) card contained in the fuse assembly. Ensure that the PC board is in the proper position for the line voltage being used.

1. Prior to connecting power to the signal monitor, ensure that the PC card is set to the appropriate position.

2. Connect the test equipment as shown in **Figure 4-1** and set the autotransformer to the minimum output voltage position.

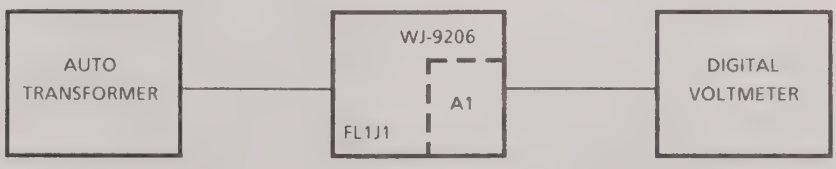


Figure 4-1. Power Supply Performance Test, Equipment Connections

3. Turn the signal monitor power switch to the ON position and slowly increase the voltage on the autotransformer toward 115 Vac. Ensure that the power consumption does not exceed 42 watts at 115 Vac or 230 Vac.

4. With a line voltage setting of 115 Vac on the autotransformer, measure the Low Voltage Power Supply voltages with the digital voltmeter. Refer to **Table 4-3** for the test point, the voltage, and the specified tolerance.

Table 4-3. Low Voltage Power Supply Voltages

Test Point	Supply	Voltage (Tolerance)
A1J2, Pin 1	+15 Vdc	+15 (±0.75 Vdc)
A1J2, Pin 3	-15 Vdc	-15 (±0.75 Vdc)
A1J2, Pin 6	+8 Vdc	+8 (±0.5 Vdc)

5. Slowly decrease the autotransformer output voltage until the display fails to operate properly. Verify the autotransformer output voltage is less than or equal to 103.5 Vac or 207 Vac.

6. Disconnect the test equipment.

4.6.2 HIGH VOLTAGE POWER SUPPLY/DEFLECTION AMPLIFIER PERFORMANCE TEST

1. Connect a 21.4 MHz 0 dBm signal to A2J3. Select the RCVR 1 input.

2. Verify the presence of a sweep trace on the CRT. The displayed trace on the CRT indicates that the High Voltage power supply is functioning.

3. Rotate the front panel INTENSITY control knob and verify that at minimum intensity (maximum counterclockwise) the trace is not visible on the display. At the maximum intensity (maximum clockwise), the trace has adequate intensity and does not expand or lose its focus.

4.6.3 MARKER ACCURACY AND AMPLITUDE PERFORMANCE TEST

1. Connect the signal generator to INPUT 1 (connector A3J3) on the rear panel of the WJ-9206. Set the signal generator frequency for 21.4 MHz, -65 dBm.

2. Turn the marker on, and "fine-tune" the signal generator frequency and amplitude for a zero-beat indication. Note the signal generator frequency. It should be 21.4 MHz ±1kHz.

3. Disconnect the signal generator from the WJ-9206. Ensure that the sweep rate is not so great that the amplitude of the signal is reduced. If the sweep rate is too great, reduce the sweep rate until the displayed signal amplitude is no longer reduced. With the marker still on, verify that the height of the marker positions the peak between the third and fifth horizontal "tick marks" on the CRT.

4. Connect the spectrum analyzer to INPUT 1 (connector A3J3) on the rear panel of the WJ-9206. Select input 1 on the front panel of the WJ-9206. Adjust the spectrum analyzer as required, tune the marker signal to 21.4 MHz. Note the marker radiation. It should be a maximum of -80 dBm.

4.6.4 SWEEP CENTERING AND ACCURACY PERFORMANCE TEST

1. Select Input 1 on the front panel of the WJ-9206 Signal Monitor. Set the sweep width control on the WJ-9206 to 0 kHz and turn on the marker. Set the sweep rate control on the WJ-9206 to the 12 o'clock position.

2. Adjust the sweep centering control on the WJ-9206 front panel until the entire baseline rises in level equal to the marker amplitude measured in **paragraph 4.6.3.**

3. Reset the DISPERSION control to the 5M position. Verify that the marker signal is positioned to within ± 1/2 division of the center graduation of the CRT.

4. Verify that the indicating mark of the sweep centering knob is between 11 and 1 o'clock positions.

5. Set the DISPERSION control to the 5M position (or the widest sweep available). Connect the signal generator to INPUT 1 (connector J3) on the WJ-9206 rear panel. Tune the generator to 21.4 MHz, -60 dBm.

6. Observe the displayed trace on the CRT. Verify that it is symmetrical and centered on the SM display.

7. Tune the signal generator frequency until the displayed signal is at the rightmost graduation on the CRT. Note the signal generator frequency.

8. Tune the signal generator frequency until the displayed signal is at the leftmost graduation on the CRT. Note the signal generator frequency. The difference in frequency should be 5 MHz ±500 kHz.

9. Repeat steps 7 and 8 for a 1 MHz ±100 kHz DISPERSION setting in place of the widest available.

4.6.5 INPUT SELECTOR PERFORMANCE TEST

1. Connect the test equipment as shown in **Figure 4-2.** Set the signal generator for a 21.4 MHz.

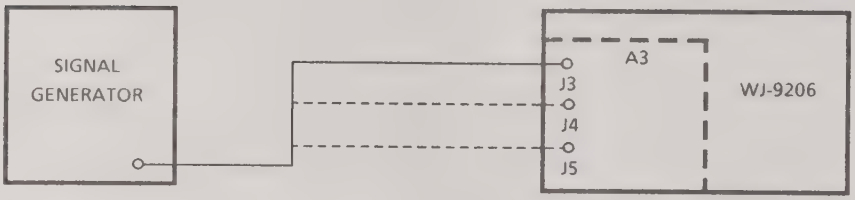


Figure 4-2. Input Selector Performance Test, Equipment Connections

2. Select INPUT 1 on the WJ-9206 front panel and observe the level displayed on the CRT.

3. Move the signal generator output to the A3J4 connector (IF IN 2) on the rear panel of the WJ-9206. Select INPUT 2 on the WJ-9206 front panel and observe the level displayed on the CRT.

4. Move the signal generator output to the A3J5 connector (IF IN 3) on the rear panel of the WJ-9206. Select INPUT 3 on the WJ-9206 front panel and observe the level displayed on the CRT.

4.6.6 LOG/IF DETECTOR PERFORMANCE TEST

1. Connect the signal generator to INPUT 1 on the WJ-9206 rear panel (connector A3J3). Select INPUT 1 on the WJ-9206 front panel.

2. Set the signal generator frequency to 21.4 MHz, -27 dBm. Set the DISPERSION width control for a sweep width of 500 kHz. Rotate the sweep rate control fully counterclockwise.

3. Connect channel 1 of the oscilloscope to the X output (rear panel connector J6) of the WJ-9206. Adjusting the oscilloscope as required, determine the period (elapsed time) of the ramp signal displayed. Note the period. It should be a minimum of 200 ms.

4. Rotate the sweep rate control fully clockwise. Repeat step 3. It should be a maximum of 25 ms.

5. Connect the test equipment as shown in **Figure 4-3.** Set the oscilloscope inputs for 0.1 volts/division. Adjust the X axis (horizontal) position control so that the dot is at the center of the lower area of the CRT.

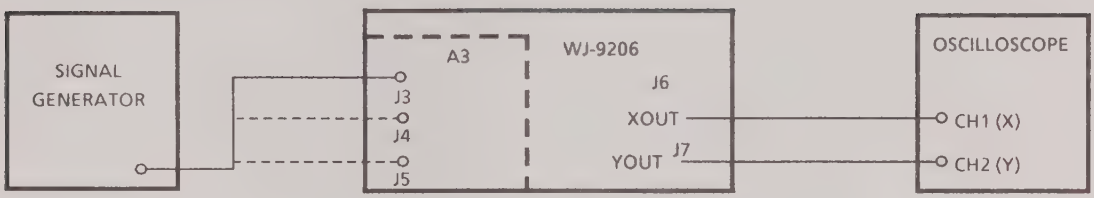


Figure 4-3. LOG/IF Detector Performance Test, Equipment Connections

6. Connect the oscilloscope to the X (connector J6) and Y (connector J7) outputs on the WJ-9206. The X axis signal should be sweeping virtually the entire width of the oscilloscope CRT. Note the voltage at the low frequency end of the X axis sweep. Note the voltage at the high frequency end of the X axis sweep.

7. Note the position of the peak of the displayed signal. While viewing the signal, step the signal generator amplitude down in 10 dB steps, for a total of 60 dB. Verify that the displayed signal amplitude decreases in 0.1 ± 0.02 volt steps.

4.6.7 INPUT ATTENUATOR DETECTOR PERFORMANCE TEST

1. Connect the test equipment as shown in **Figure 4-2.** Set the signal generator for 21.4 MHz, CW, with an output level to produce a signal on the CRT at the top graduation with 0 dB attenuation.

2. Use the ATTENUATION switch on the front panel of the WJ-9206 to select 10 dB of attenuation. Verify that the displayed signal on the CRT has decreased approximately one graduation mark.

3. Repeatedly increase the amount of signal monitor attenuation, while observing the CRT display. For each 10 dB increase in attenuation, the display amplitude should drop approximately one graduation.

4.7 ALIGNMENT PROCEDURES

The following alignment procedures should be performed only after the signal monitor failed a performance test or after a module has been repaired or replaced.

WARNING

Exercise extreme caution when aligning this unit with the protective covers removed. Potentially lethal voltages are used in this unit.

4.7.1 HIGH VOLTAGE POWER SUPPLY/DEFLECTION AMPLIFIER ALIGNMENT

CAUTION

Due to potentially lethal voltages contained on this assembly, extreme caution is necessary when aligning this assembly. Use only the insulated alignment tool when aligning this assembly.

1. Locate the High Voltage Power Supply/Deflection Amplifier circuit card, A4A1, on the WJ-9206. Using the digital voltmeter, measure the DC voltage at the "hot" (ungrounded) end of A4A1C18. Adjust, if necessary, A4A1R17 for +225 Vdc at A4A1C18.

2. Adjust the front panel FOCUS and ASTIGmatism controls for the best overall focus of the trace on the WJ-9206 CRT.

3. Locate the INTENSITY potentiometer, labeled A4A1R55. Set the intensity control fully clockwise (maximum intensity). Adjust A4A1R54 until the trace on the WJ-9206 CRT begins to "bloom", or to thicken and go out of focus. Back off A4A1R54 until the trace is bright, but just before the onset of blooming.

4. Set the front panel DISPERSION control to 5 MHz. Ensure that the front panel centering control is set to the 12 o'clock position. Adjust A4A1R6 (vertical centering) until the baseline trace is positioned over the horizontal graticule line at the bottom of the WJ-9206 CRT and the signal peak at 21.4 MHz is centered over the vertical graticule line denoting the center frequency.

5. Set the signal generator parameters as indicated in **Table 4-4.** Turn on the signal generator modulation. Adjust A4A1R27 (horizontal gain) until the signal peaks displayed on the WJ-9206 CRT are positioned over their respective frequency divisions (along the baseline). It may be necessary to readjust A4A1R7 (horizontal centering) to re-center the signal displayed on the WJ-9206 CRT.

NOTE

The signal generator's REDUCE PEAK DEV lamp will light. This is normal and should be disregarded.

6. Adjust A4A1R64 (horizontal trace alignment) so that the baseline is level with respect to the graticule baseline.

7. Reset the DISPERSION control to 100 kHz. Turn off the signal generator modulation. Verify that the signal generator output amplitude is set to -27 dBm. Adjust A4A1R34 (vertical gain) and A4A1R6 (vertical centering) so that the top of the signal peak is at the top "tick" of the graticule, and the displayed baseline is positioned over the graticule baseline. The controls interact, and some readjustment may be necessary to achieve optimum results.

Table 4-4. VCO and Marker Alignment Setup Parameters

Equipment	Control	Parameter
WJ-9206	Centering	12 o'clock position
	Dispersion	5 MHz
Signal	Frequency	21.400 MHz
Generator	Output Amplitude	-27 dBm
	FM Modulation	Internal
	Peak Deviation Range	160 kHz
	Peak Deviation Adjust	Fully clockwise
	Counter Mode Expand	X 10
	Counter Internal/External	External
	Counter External Range	0-10 MHz
	FM Modulation Output	Connect to counter input
	Modulation Frequency Range	X 3k
	Modulation Frequency Adjust	500 kHz as indicated on internal counter

8. Reset the dispersion to 5 MHz. Set the WJ-9206 sweep speed so that the IF filter in the Signal Monitor is not overswept. If necessary, adjust the front panel centering control to center the peak of the signal on the vertical graticule line denoting center frequency. Adjust A4A1R67 (vertical trace alignment) until the signal indication is aligned with the vertical graticule for its entire length.

4.7.2 SECOND LO/CONVERTER ALIGNMENT

1. Connect the WJ-9206 power line to the autotransformer output. Using the autotransformer, slowly apply power to the WJ-9206, while carefully observing the power consumption as indicated by the variac. The WJ-9206 should draw less than 42 watts.

2. Using the digital voltmeter, verify that the voltage present at the power supply feedthrough capacitors (A3C24 and A3C25) is +15 Vdc (±0.75 Vdc) and +7.5 Vdc (±0.5 Vdc) respectively. Refer to **Figure 5-5** for the component locations.

3. Locate A3C2, A3C4, A3C6 on the RF Circuit Assembly. Refer to **Figure 5-5**. Preset all three of the capacitors so that each is fully "bottomed" or set to the maximum capacity. Then back out each capacitor by three turns.

4. Locate coil A3A4L1 on the 2nd LO/2nd Converter board. Refer to **Figure 5-9**. While viewing the X:Y oscilloscope display, adjust A3A4L1 until a signal is present. Set A3A4L1 to the center of the active range of the oscillator. If desired, the voltage drop across the second LO source resistor, A3A4R3, may be monitored. The current flow through A3A4R3 changes abruptly when the oscillator starts and stops oscillating. If there is no response, the oscillator may be monitored with an oscilloscope by viewing the oscillator waveform, located at either pin 1 or pin 3 of the transformer, A3A4T1. If the transformer is monitored, the oscilloscope should have a bandwidth of 100 MHz as a minimum.

5. Adjust A3C2, A3C4, and A3C6 for a maximum amplitude indication on the X:Y oscilloscope.

4.7.3 SECOND IF AND LOG IF/DETECTOR ALIGNMENT

NOTE

While performing the following alignment, ensure that the sweep rate and/or dispersion is not so great that the IF filter is being "overswept". If this occurs, the IF filter response will be distorted. If necessary, reduce the sweep rate until the displayed signal is no longer distorted.

1. Connect a 21.4 MHz 0 dBm signal to A2J3. Select the RCVR 1 input.

2. Set the DISPERSION (swept span) on the WJ-9206 to 100 kHz. It may be necessary to re-center the signal on the X:Y oscilloscope CRT using the WJ-9206 front panel centering control. Adjust the A3A5L2, A3A5L3, A3A5L5, A3A5L6 for a symmetrical (gaussian) round-nose response, as viewed on the X:Y oscilloscope. There is considerable interaction between the individual controls, and it may be necessary to repeatedly adjust the inductors, as necessary to achieve the best response. Refer to **Figure 5-10** for component locations.

NOTE

The following alignment steps set up the detector gain so that a 10 dB increase/decrease in signal level causes a 0.1 volt change at the external X:Y output of the WJ-9206. The oscilloscope must be set up for 0.1 volt/division.

3. Set the DISPERSION of the WJ-9206 to 200 kHz. Set the signal generator output amplitude to -97 dBm. Adjust A3A6L3, A3A6L6, and A3A6L8 as required for a maximum amplitude response as indicated on the X:Y oscilloscope not the WJ-9206 CRT display. Refer to **Figure 5-11** for component locations.

4. Adjust the log offset control, A3A6R34 for a 0 Vdc baseline level, as indicated on the X:Y oscilloscope. Using the oscilloscope's vertical position control, set the displayed baseline 1/2 division above the bottom horizontal line on the X:Y oscilloscope graticule.

5. Increase the signal generator output amplitude to -27 dBm. Adjust the log gain control, A3A6R30, until the peak of the signal is 7 1/2 divisions above the baseline. This corresponds to a signal amplitude of 0.75 volts.

6. Decrease the signal generator output amplitude to -97 dBm. Adjust the log threshold control, A3A6R2, for a 1/2 division signal peak, as viewed on the X:Y oscilloscope. This level corresponds to an amplitude of 0.05 volts.

7. Repeat steps 3 through 5 to obtain the "best fit" response with respect to amplitude accuracy. Step the signal generator amplitude, in 10 dB increments, from -97 to -27 dBm. Verify that the signal peak displayed on the X:Y oscilloscope tracks the input signal level with a maximum inaccuracy of ±2 dB at each 10 dB step. This means that the amplitude tracking must be accurate to 1/5 of a vertical (X-axis) division.

4.7.4 VCO AND MARKER ALIGNMENT

1. Set the WJ-9206 and signal generator as indicated in **Table 4-4.** Refer to **Figures 5-7** and **5-8** for component locations.

NOTE

The signal generator's REDUCE PEAK DEV lamp will light. This is normal and should be disregarded.

2. Determine that a "comb" of signals is displayed on the X:Y oscilloscope display. Refer to **Figure 4-4.** The strongest signal (tallest peak) should be 21.4 MHz. This can be verified by turning the modulation off and noting where the signal peak is. The signal peaks displayed are 500 kHz apart, and when the VCO is correctly aligned, each peak is equally spaced across the X:Y oscilloscope CRT. Normally, each peak is positioned over a graticule line. For reference purposes, the 21.4 MHz peak is considered the center frequency, the peaks to the left (lower in frequency are called -1,-2, etc., and the peaks to the right (higher in frequency) are called +1, +2, etc.

3. Refer to **Figure 5-8** for component locations. Adjust A3A3C9 (center frequency) to adjust the frequency of the -4 and -5 signal peaks. Adjust A2R26 (sweep gain) to adjust the horizontal spacing between the signal peaks. Align the -4 and -5 peaks, at the low frequency end of the display, with the graticule division that are 4 and 5 divisions to the left of center.

4. Align the -1 and -2 peaks with the graticule division that are 1 and 2 divisions to the left of center by adjusting A3A3R16 (gain 1) and A3A3R9 (breakpoint 1).

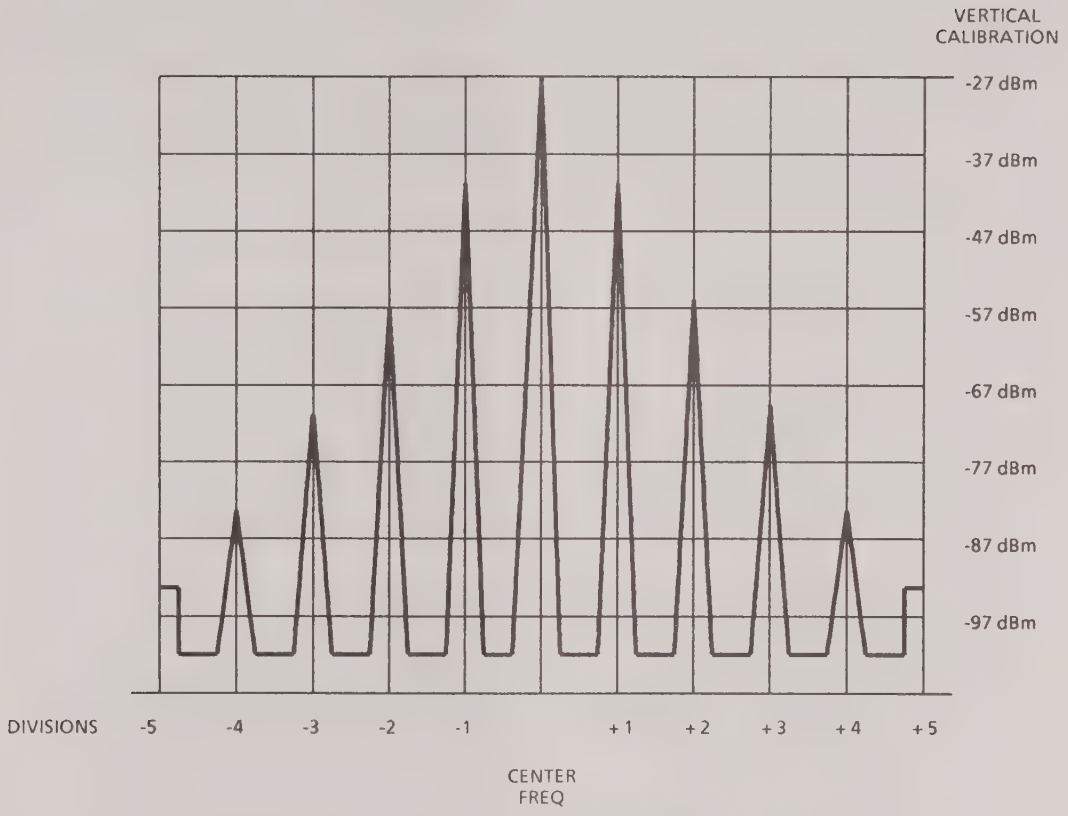
5. Align the peaks +1, +2, and +3 with their respective horizontal graticule divisions by adjusting A3A3R15 (gain 2) and A3A3R11 (breakpoint 2).

6. It may be necessary to repeat steps 3 through 5 to obtain the best overall alignment.

7. Reset the signal generator counter to the internal mode. Turn off the signal generator modulation. Set the WJ-9206 dispersion to 0 kHz.

8. Using the WJ-9206 front panel center frequency control, adjust the center frequency of the WJ-9206 until the entire baseline rises to the maximum amplitude. Reset the DISPERSION to 5 MHz. Verify that the signal peak is horizontally centered on the X:Y oscilloscope CRT. Adjust A3A3C9 to reset the WJ-9206 center frequency. Leave the signal generator connected for the next series of alignments.

9. Turn off the signal generator RF output. Turn on the internal marker, using the front panel switch. If there is no signal indication, adjust A3A2C1. If necessary, adjust A3A2R9 to set the marker amplitude to between three and five divisions in height. Refer to **Figure 5-7.**



-5 DIVISIONS = 18.900 MHz
-4 DIVISIONS = 19.400 MHz
-3 DIVISIONS = 19.900 MHz
-2 DIVISIONS = 20.400 MHz
-1 DIVISIONS = 20.900 MHz

CENTER = 21.400 MHz

+1 DIVISIONS = 21.900 MHz
+2 DIVISIONS = 22.400 MHz
+3 DIVISIONS = 22.900 MHz
+4 DIVISIONS = 23.400 MHz
+5 DIVISIONS = 23.900 MHz

Sensitivity for both X and Y channels is 0.1 volt/division Both channels of the oscilloscope must be DC coupled.

Horizontal scale calibration is 500 kHz per division. Center frequency is 21.400 MHz.

Vertical Scale calibration is 10 dB per division. With the baseline 1/2 division above the bottom of the X:Y oscilloscope CRT, A -27 dBm signal will indicate a peak 7 1/2 divisions above the baseline (8 divisions above the bottom of the CRT).

Figure 4-4. X:Y Oscilloscope Display during VCO Sweep Alignment

10. Turn on the signal generator RF output. Tune the signal generator frequency slightly off to one side of the marker signal, and set the signal generator amplitude so that the generator and marker signals are of the same amplitude. Tune the signal generator frequency to that of the marker, and carefully zero-beat the marker. Reset the dispersion, as required. If the frequency indicated by the signal generator is not 21.4 MHz ±2 kHz, adjust A3A2C1 to move the marker on frequency. Turn off the marker after adjusting.

4.7.5 INPUT SWITCHING AND SWEEP REVERSAL

NOTE

All unused inputs must be terminated with 50 ohm terminations.

1. Connect the signal generator to INPUT 1 on the rear panel of the WJ-9206. Tune the signal generator to 21.4 MHz, -27dBm.

2. Note the signal peak as displayed on the X:Y oscilloscope when the signal generator is connected to INPUT 1.

3. Using the WJ-9206 front panel INPUT switch, select input 2. Verify that the signal displayed while input 2 is selected is attenuated by at least 55 dB below the level when input 1 was selected (step 2).

4. Repeat step 3 using INPUT 3.

5. Connect the signal generator to INPUT 2, and select input 2 from the WJ-9206 front panel. Verify that the signal amplitude is the same as that noted for INPUT 1 in step 2.

6. Select input 3 from the test fixture front panel. Verify that the signal displayed is at least 55 dB down from the signal amplitude noted in step 5.

7. Connect the signal generator to INPUT 3, and select input 3 from the WJ-9206 front panel. Verify that the signal amplitude is the same as that noted for INPUT 1 in step 2.

NOTE

If the A3 RF Circuit Assembly is being aligned outside of the WJ-9206 chassis, ensure that connector A3J1 is connected between the RF Assembly and the signal monitor mainframe before performing the following test.

8. With the signal generator connected to INPUT 3, tune the generator so that the signal displayed is off to one side of the X:Y oscilloscope CRT.

9. With a test clip, ground pin 6 of the RCVR INTF 3 connector, J3, on the rear panel of the WJ-9206. Verify that the signal peak is repositioned to the other side of the X:Y oscilloscope CRT.

10. Remove the test clip. Ground pin 6 of the RCVR INTF 1 connector, J1, on the rear panel of the WJ-9206. Verify that the trace is not affected.

11. Remove the test clip. Ground pin 6 of the RCVR INTF 2 connector, J2, on the rear panel of the WJ-9206. Verify that the trace is not affected.

12. Connect the signal generator to INPUT 1. Select INPUT 1 from the front panel of the WJ-9206. Repeat steps 8 through 11 using INPUT 1 in place of INPUT 3. Verify that the signal peak is repositioned to the other side of the X:Y oscilloscope CRT when the appropriate sweep reverse pin is grounded.

13. Connect the signal generator to INPUT 2. Select INPUT 2 from the front panel of the WJ-9206. Repeat steps 8 through 11 using INPUT 2 in place of INPUT 3. Verify that the signal peak is repositioned to the other side of the X:Y oscilloscope CRT when the appropriate sweep reverse pin is grounded.

SECTION V

REPLACEMENT PARTS LIST

SECTION V

REPLACEMENT PARTS LIST

5.1 UNIT NUMBERING METHOD

The method of numbering used throughout the unit is assigning reference designations (electrical symbol numbers) to identify: assemblies, subassemblies, modules within a subassembly, and discrete components. An example of the unit numbering method used is as follows:

Subassembly Designation A1	R1 Class and No. of Item
Identify from right to left as:	First (1) resistor (R) of first (1) subassembly (A)

On the main chassis schematic, components which are an integral part of the main chassis have no subassembly designations.

5.2 REFERENCE DESIGNATION PREFIX

The use of partial reference designations are used on the equipment and on the manual illustrations. This partial reference designation consists of the component type letter(s) and the identifying component number. The complete reference designation may be obtained by placing the proper prefix before the partial reference designation. Reference designation prefixes are included on the drawings and illustrations in the figure titles (in parenthesis).

5.3 LIST OF MANUFACTURERS

Mfr. Code	Name and Address	Mfr. Code	Name and Address
00779	AMP Incorporated P.O. Box 3608 Harrisburg, PA 17105	05245	Corcom Incorporated 1600 Winchester Road Libertyville, IL 60048
01121	Allen-Bradley Company 500 Elm Grove Road Milwaukee, WI 53122	07263	Fairchild Semiconductor Division 10400 Ridgeview Court Cupertino, CA 95014
01295	Texas Instruments Incorporated 13500 North Central Expressway Dallas, TX 75231	09021	Airco Electronics P.O. Box 547 Bradford, PA 16701
04713	Motorola Incorporated 5005 East McDowell Road Phoenix, AZ 85008	09353	C&K Components Incorporated 15 Riverdale Avenue Newton, MA 02158

Mfr. Code	Name and Address
13103	Thermalloy Company 2021 W. Valley View LAne Dallas, TX 75234
14632	Watkins-Johnson Company 700 Quince Orchard Road Gaithersburg, MD 20878
15542	Mini-Circuits Lab. 2625 E. 14th Street Brooklyn, NY 11229
15912	Thomas & Betts Corporation Electronics Group 4371 Valley Boulevard Los Angeles, CA 90032
17856	Siliconix, Incorporation 2201 Laurelwood Road Santa Clara, CA 95050
18324	Signetics Corporation Military Products Division 4130 S. Market Court Sacramento, CA 95834
19701	Mepco/Centralab P.O. Box 760 Mineral Wells, TX 76067
22526	Berg Electronics Incorporated 515 Fishing Creek Road New Cumberland, PA 17070
23936	W.J. Purdy Company 770 Airport Boulevard Burlington, CA 94010
25088	Siemens America Incorporated 186 Wood Avenue S. Iselin, NJ 08830
25120	Piezo Technology Incorporated P.O. Box 7877 2400 Diversified Way Orlando, FL 32804
27014	National Semiconductor Corp. 2900 Semiconductor Drive Santa Clara, CA 95051
27264	Molex Incorporated 2222 Wellington Court Lisle, IL 60532
29990	American Technical 1 Norden Lane Huntington Station, NJ 11746
33095	Spectrum Control Incorporated 152 E. Main Street Fairview, PA 16415
51642	Centre Engineering 2820 E. College Avenue State College, PA 16801
52648	Plessy Semi-Conductors 1641 Kaiser Avenue Irvine, CA 92714
52673	K.S.W. Electronics Corporation South Bedford Street Burlingtron, MA 01803
55027	Q-Bit Corporation 311 Pacific Avenue, N.E Palm Bay, FL 32905
55322	Samtec Incorporated 801 Progress Boulevard P.O. Box 1147 New Albany, IN 47150

Mfr. Code	Name and Address
56289	Sprague Electronics Company 300 Minuteman Road North Adams, MA 01247
59660	Tusonix Incorporated 2155 Forbes Boulevard, Suite 107 Tucson, AZ 85745
7W259	Tecal Corporation 9108 Mayflower Avenue El Paso, TX 79925
71279	Interconnection Products, Inc. 2601 S. Garnsey Santa Ana, CA 92707
71400	Bussman 114 Old State Road P.O. Box 14460 St. Louis, MO 63178
71785	Labinal Components & System Incorporated 1521 Morse Avenue Elk Grove Village, IL 60007
72825	Eby Company Subsidiary of Redm Industries 2751 South Hampton Road Philadelphia, PA 19154
73138	Beckman Instrument, Inc. 2500 Harbor Boulevard Fullerton, CA 92634
74840	Illinois Capacitor Incorporated 3757 W. Touhy Avenue Lincolnwood, IL 60645
76493	Bell Industries Incorporated 19070 Reyes Avenue P.O. Box 5825 Compton, CA 90024
80058	Joint Electronics Type Designation System
80131	Electronics Industries Assoc. 2001 Eye Street N.W. Washington, DC 20006
81073	Grayhill Incorporated 561 Hillgrove Avenue LaGrange, IL 60526
81349	Military Specifications
81483	International Rectifier 9220 Sunset Boulevard Los Angeles, CA 90069
83003	Varco Incorporated 2203 Walnut Street P.O. Box 401426 Garland, TX 75042
91293	Johanson, Manufacturing Co. 400 Rockway Valley Road Boonton, NJ 07005
85146	Alco Electronics Products, Inc. 1551 Osgood Street North Andovr, MA 01845
99800	Delevan Electronics Division 270 Quaker Road East Aurora, NY 14052

5.4 PARTS LIST

The following parts lists contain all the electrical components used in the unit, along with mechanical parts which may be subject to unusual wear or damage. When ordering replacement parts from the Watkins-Johnson Company, specify the unit type, the serial number, and the option configuration. Also include the reference designation and the description of each item ordered. The list of manufacturers, provided in **paragraph 5.3**, and the manufacturer's part number, provided in **paragraph 5.5**, are supplied as a guide to aid the user of the equipment while in the field. The parts listed may not necessarily be identical with the parts installed in the unit. The parts listed in **paragraph 5.5** will provide for satisfactory unit operation.

Replacement parts may be obtained from any manufacturer provided that the physical characteristics and electrical parameters of the replacement item are compatible with the original part. In the case where components are defined by a military or industrial specification, a vendor which can provide the necessary component is suggested as a convenience to the user.

NOTE

As improved semiconductors become available, it is the policy of Watkins-Johnson to incorporate them in proprietary products. For this reason some transistors, diodes and integrated circuits installed in the equipment may not agree with those specified in the parts lists and schematic diagrams of this manual. However, the semiconductors designated in the manual may be substituted in every case with satisfactory results.

5.5 TYPE WJ-9206 SIGNAL MONITOR MAIN CHASSIS

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
	Revision H				
A1	Power Supply	1	796497-1	14632	
A2	Sawtooth Generator	1	796498-1	14632	
A3	RF Assembly	1	796499-2	14632	
A4	High Voltage Power Supply/Video	1	796799-1	14632	
B1	Fan, Blower - 12-30 Vdc	1	814	23936	
C1	Capacitor, Ceramic, Feedthru: 5000 pF, 200 V	4	2425-018X5W0-502AA	59660	
C2 Thru C4	Same as C1				
F1	Fuse, Cartridge, 1/2 Amp	1	MDL1/2	71400	
FL1	Filer, Line, AC Line	1	6J4	05245	
J1	Connector, Plug, Multipin, 15 Position	3	205206-1	00779	
J2	Same as J1				
J3	Same as J1				
P1	Connector Housing	2	09-50-3091	27264	
P2	Same as P1				
P3	Connector/Plug, 3 Position	1	87499-5	00779	
S1	SW, Pushbutton	1	8161-S-H-Z3-Q-E	09353	
T1	Transformer, Power, 110/220 Voltage	1	841203	14632	

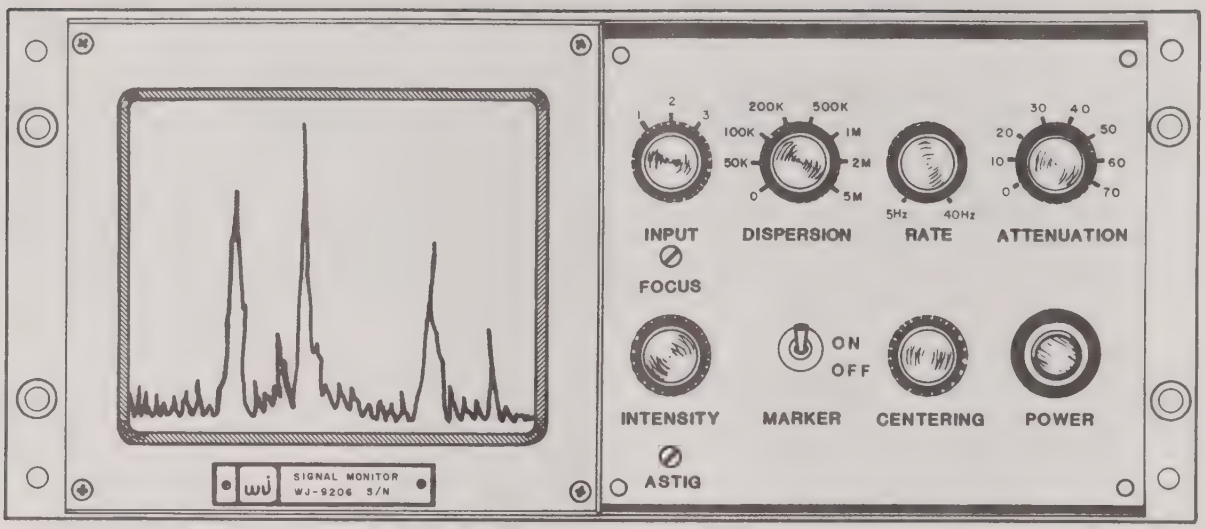


Figure 5-1. Type WJ-9206 Signal Monitor, Front View, Location of Components

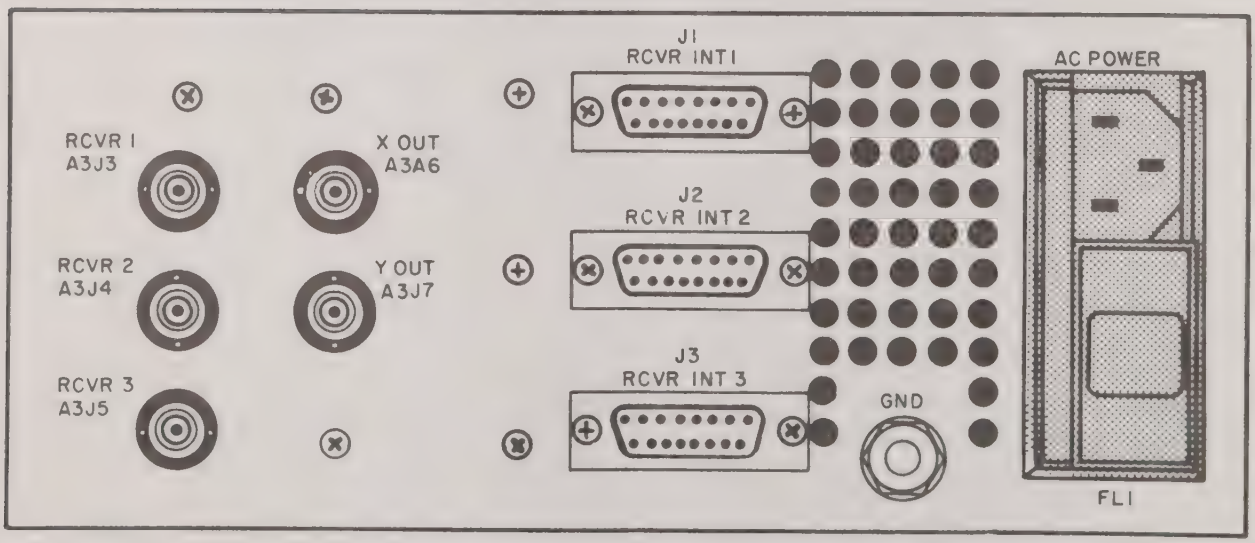


Figure 5-2. Type WJ-9206 Signal Monitor, Rear View, Location of Components

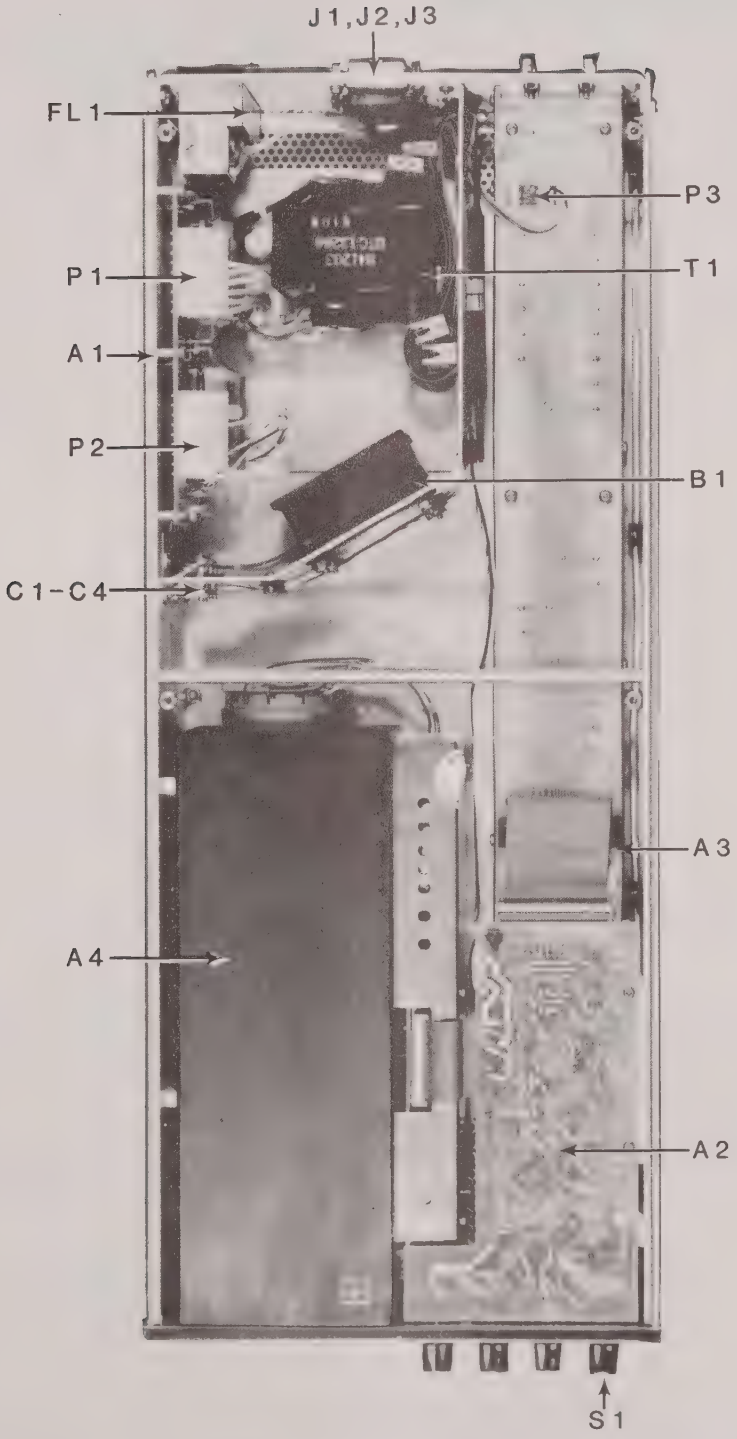


Figure 5-3. Type WJ-9206 Signal Monitor, Top View, Location of Components

5.5.1 TYPE 796497-1 POWER SUPPLY

REF DESIG PREFIX A1

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
	Revision A				
C1	Capacitor, Ceramic, Disc: .01 µF, 20%, 50 V	6	34453-1	14632	
C2 Thru C4	Same as C1				
C5	Capacitor, Electrolytic, Aluminum: 3300 µF, ±10% 75%, 35 V	4	338TTA035B	74840	
C6	Same as C5				
C7	Capacitor, Electrolytic, Tantalum: 1 µF, 20%, 35 V	7	196D105X0035HE3	56289	
C8	Same as C7				
C9	Same as C5				
C10	Same as C7				
C11	Same as C7				
C12	Same as C1				
C13	Same as C1				
C14	Same as C5				
C15 Thru C17	Same as C7				
CR1	Diode	4	1N4005	80131	
CR2 Thru CR4	Same as CR1				
CR5	Diode	2	1N5819	80131	
CR6	Same as CR5				
J1	Connector, Receptacle: 9 Pin	2	09-72-2091	27264	
J2	Same as J1				
R1	Resistor, Fixed, Film: 1.33 kΩ, 1%, 1/10 W	1	RN55C1331F	81349	
R2	Resistor, Fixed, Film: 243 Ω, 1%, 1/10 W	1	RN55C2430F	81349	
U1	Voltage Regulator, +15 V	1	LM340T-15	27014	
U2	Voltage Regulator, −15 V	1	LM320T-15	27014	
U3	Voltage, Regulator, Adjustable, +1.2 to 37 V	1	LM317T	27014	

5.5.2 TYPE 796498-1 SAWTOOTH GENERATOR

REF DESIG PREFIX A2

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
	Revision B1				
C1	Capacitor, Electrolytic, Tantalum: 1.0 µF,10%, 35 V	1	CS13BF105K	81349	
C2	Capacitor, Ceramic, Disc: .1 µF, 20%, 50 V	2	34475-1	14632	
C3	Not Used				
C4	Not Used				
C5	Same as C2				
C6	Capacitor, Ceramic, Disc: .01 µF, 20%, 50 V	4	34453-1	14632	
C7 Thru C9	Same as C6				
E1	Terminal, Forked	4	140-1941-02-01	71279	
E2 Thru E4	Same as E1				
E5	Terminal, Forked	5	140-1019-02-01	71279	
E6 Thru E9	Same as E5				
J1	Connector, Multipin, 34 pins	1	609-3407	15912	
J2	Connector, Paddle Board, 26 pins	1	88216-5	00779	
P1	Connector, Plug: 26 Sockets	1	609-2601M	15912	
Q1	Transistor	1	2N3906	80131	
R1	Resistor, Fixed, Film: 6.8 kΩ, 5%, 1/4 W	1	CF1/4-6.8 K/J	09021	
R2	Resistor, Fixed, Film: 22 kΩ, 5%, 1/4 W	1	CF1/4-22 K/J	09021	
R3	Resistor, Fixed, Film: 15 kΩ, 5%, 1/4 W	1	CF1/4-15 K/J	09021	
R4	Resistor, Fixed, Film: 56 kΩ, 5%, 1/4 W	1	CF1/4-56 K/J	09021	
R5	Resistor, Variable, Composition: 10 kΩ, 10% 1 W	1	70M3N048L103U	01121	
R6	Resistor, Fixed, Film: 1.0 kΩ, 5%, 1/4 W	1	CF1/4-1 K/J	09021	
R7	Resistor, Fixed, Film: 10 kΩ, 5%, 1/4 W	7	CF1/4-10 K/J	09021	
R8	Resistor, Fixed, Film: 10 kΩ, 1%, 1/10 W	8	RN55C1002F	81349	
R9	Resistor, Fixed, Film: 30 kΩ, 1 , 1%, 1/10 W	1	RN55C3012F	81349	
R10	Same as R8				
R11	Same as R7				
R12	Same as R8				
R13	Resistor, Fixed, Film: 47 kΩ, 5%, 1/4 W	1	CF1/4-47 K/J	09021	
R14	Same as R7				
R15	Same as R3				
R16	Resistor, Fixed, Film: 270 kΩ, 5%, 1/4 W	2	CF1/4-270 OHMS/J	09021	
R17	Resistor, Fixed, Film: 60.4 kΩ, ±1%, 1/10 W	1	RN55C6042F	81349	
R18	Resistor, Fixed, Film: 20 kΩ, 1%, 1/10 W	1	RN55C2002F	81349	
R19	Same as R8				
R20	Resistor, Fixed, Film: 6.04 kΩ, 1%, 1/10 W	1	RN55C6041F	81349	

REF DESIG PREFIX A2

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
R21	Resistor, Fixed, Film: 2.0 kΩ, 1%, 1/10 W	1	RN55C2001F	81349	
R22	Resistor, Fixed, Film: 1.0 kΩ, 1%, 1/10 W	2	RN55C1001F	81349	
R23	Same as R22				
R24	Same as R7				
R25	Same as R7				
R26	Resistor, Trimmer, Film: 10 kΩ, 10%, 1/2 W	1	62PAR10K	73138	
R27 Thru R30	Same as R8				
R31	Resistor, Fixed, Film: 10 Ω, 5%, 1/4 W	2	CF1/4-10 OHMS/J	09021	
R32	Same as R31				
R33	Resistor, Fixed, Film: 6.8 kΩ, 5%, 1/4 W	1	CF1/4-6.8 K/J	09021	
R34	Resistor Variable, Composition: 10 kΩ, 10%, 1 W	1	70A3N048L103U	01121	
R35	Same as R13				
R36	Same as R7				
R37	Resistor, Fixed, Film: 4.7 kΩ, 5%, 1/4 W	1	CF1/4-4.7 K/J	09021	
R38	Same as R16				
R39	Same as R7				
S1	Switch Rotary	3	71ADF30-01-1-AJN-C	81073	
S2	Same as S1				
S3	Same as S1				
S4	Switch/Toggle, SPDT	1	MTA106D	95146	
U1	Integrated Circuit, Voltage Regulator: ±5 V	1	LM336Z-5.0	27014	
U2	Integrated Circuit, Dual Comparator	1	LM393N	27014	
U3	Integrated Dual Operational Amplifier	1	MC1458CP1	04713	
U4	Integrated Circuit/OP-AMP	1	TL074CN	01295	
U5	Integrated Circuit, Timer	1	NE555N	18324	
U6	Integrated Circuit, Switch, Dual, SPST	1	DG200BA	17856	
U7	Integrated Circuit, 3-input, NAND Gate	1	MM74HC10N	27014	
U8	Integrated Circuit, 8-bit, Prior Encoder	1	MC14532BCP	04713	
U9	Resistor, Network, 10 kΩ	2	898-3-R10K	73138	
U10	Same as U9				
U11	Integrated Circuit, Quad 2-input OR Gate	1	MM74HC32N	27014	
U12	Integrated Circuit, OP AMP	1	TL081CP	01295	

5.5.3 TYPE 796499-2 RF ASSEMBLY

REF DESIG PREFIX **A3**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
	Revision B				
A1	Input Selector/Step Attenuator	1	796500-1	14632	
A2	Input Filter/21.4 MHz Marker	1	796501-2	14632	
A3	VCO/First Converter	1	796502-1	14632	
A4	Second LO/Converter	1	796504-1	14632	
A5	Second IF Assembly	1	796614-1	14632	
A6	Log IF/Detector	1	796506-2	14632	
A7	Interface Circuit Assembly	1	380876-1	14632	
C1	Not Used				
C2	Capacitor Variable, Air: .8-10.0 pF, 250 V	3	5202 W/Lock Washer	91293	
C3	Capacitor, Ceramic, Monolithic: 15 pF, ±2%, 100 V	2	100-100-NPO-150G	51642	
C4	Same as C2				
C5	Capacitor, Ceramic, Monolithic: 10 pF, ±2%, 100 V	1	100-100-NPO-100G	51642	
C6	Same as C2				
C7	Same as C3				
C8	Not Used				
C9	Capacitor, Ceramic, Feedthru: 1000 pF, 500 V	27	54-794-009-102W	33095	
C10 Thru C35	Same as C9				
C36	Capacitor, Ceramic, Monolithic: 1000 pF, ±2%, 100 V	2	150-100-NPO-102G	51642	
C37	Same as C36				
J1	Not Used				
J2	Not Used				
J3	Connector, Receptacle, BNC	5	UG1094U	80058	
J4 Thru J7	Same as J3				
L1	Coil, Fixed: .178 µH, 1%	3	L10-0R178	7W259	
L2	Coil, Fixed: 2.2 µH, 10%	2	1025-28	99800	
L3	Same as L1				
L4	Same as L2				
L5	Same as L1				
L6	Coil, Fixed: .1000 µH, 10%	2	1025-92	99800	
L7	Same as L6				
L8	Coil, Fixed: .47 µH, 10%	2	1025-12	99800	
L9	Same as L8				

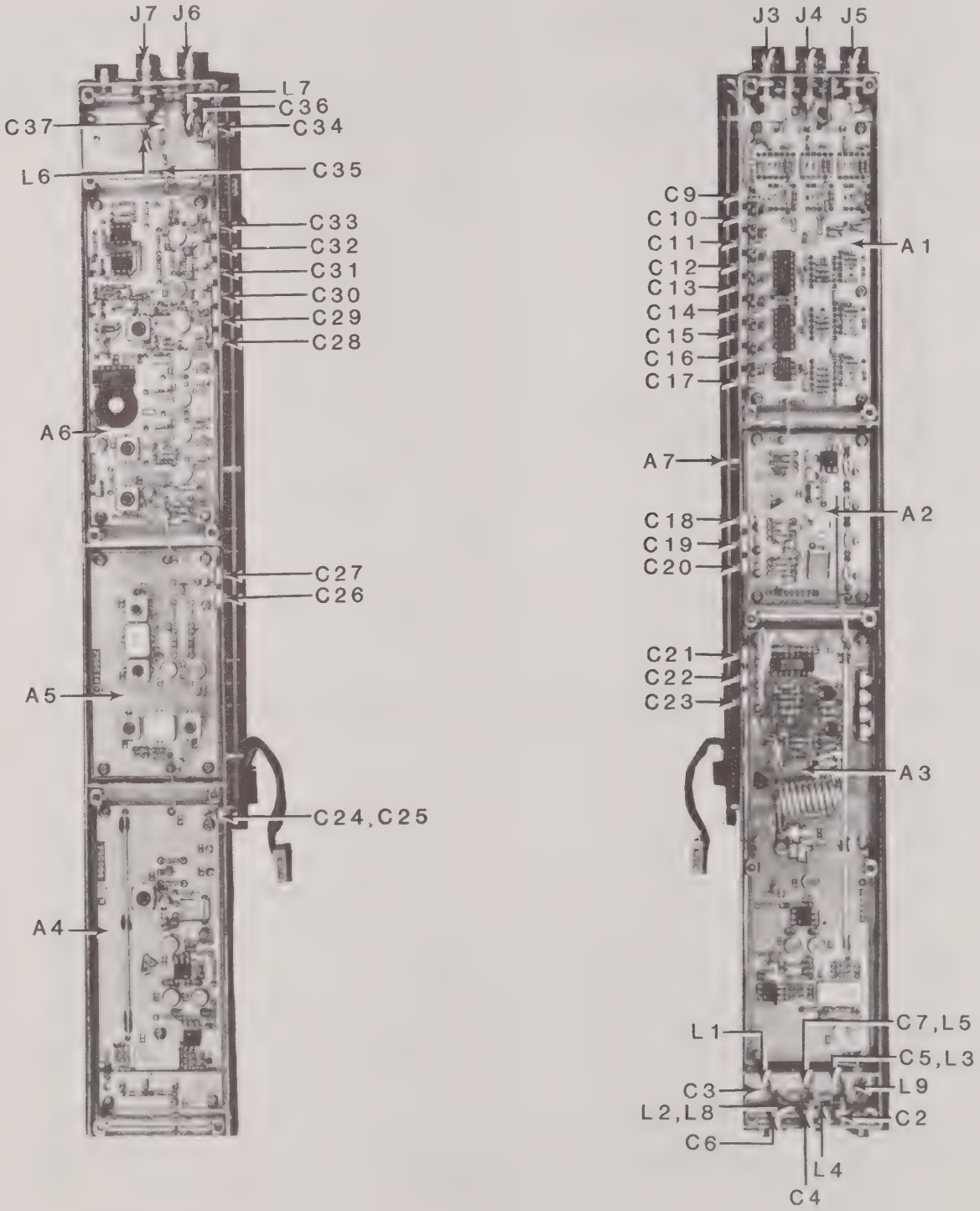


Figure 5-4. Type 796499-2 RF Assembly (A3), Location of Components

5.5.3.1 **Type 796500-1 Input Selector/Step Attenuator** REF DESIG PREFIX **A3A1**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
	Revision B				
C1	Capacitor, Ceramic, Disc: .01 µF,20%, 50 V	38	34453-1	14632	
C2 Thru C19	Same as C1				
C20	Capacitor, Electrolytic, Tantalum: 4.7 µF,20%, 35 V	1	196D475XX0035JE3	56289	
C21	Same as C2				
C22 Thru C39	Same as C1				
CR1	Diode, Pin	24	BA482	52673	
CR2 Thru CR24	Same as CR1				
E1	Terminal	14	TSW-101-07-G-S	55322	
E2 Thru E14	Same as E1				
L1	Coil, Fixed: 18 µH,10%	11	1025-50	99800	
L2 Thru L11	Same as L1				
L12	Coil, Fixed Molded: 4.7 µH,10%	2	1025-36	99800	
L13	Same as L12				
R1	Resistor, Fixed, Film: 10Ω, 5%, 1/4 W	6	CF1/4-10 OHMS/J	09021	
R2	Same as R1				
R3	Resistor, Fixed, Film: 10 kΩ, 5%, 1/4 W	7	CF1/4-10 K/J	09021	
R4 Thru R6	Same as R3				
R7	Resistor, Fixed, Film: 2.2 kΩ, 5%, 1/4 W	1	CF1/4-2.2 K/J	09021	
R8	Resistor, Fixed, Film: 47Ω, 5%, 1/4 W	3	CF1/4-47 OHMS/J	09021	
R9	Resistor, Fixed, Film: 2.7 kΩ, 5%, 1/4 W	16	CF1/4-2.7 K/J	09021	
R10	Same as R9				
R11	Same as R9				
R12	Same as R8				
R13 Thru R15	Same as R9				
R16	Same as R8				
R17 Thru R19	Same as R9				
R20	Same as R1				
R21	Same as R9				

REF DESIG PREFIX **A3A1**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
R22 Thru R24	Same as R3				
R25 Thru R37	Not Used				
R38	Same as R9				
R39	Resistor, Fixed, Film: 27Ω, 5%, 1/4 W	2	CF1/4-27 OHMS/J	09021	
R40	Resistor, Fixed, Film: 39Ω, 5%, 1/4 W	5	CF1/4-39 OHMS/J	09021	
R41	Same as R39				
R42	Same as R9				
R43	Same as R9				
R44	Same as R40				
R45	Same as R1				
R46	Same as R40				
R47	Same as R9				
R48	Same as R9				
R49	Same as R40				
R50	Same as R1				
R51	Resistor, Fixed, Film: 82Ω, 5%, 1/4 W	1	CF1/4-82 OHMS/J	09021	
R52	Same as R1				
R53	Same as R40				
R54	Same as R9				
U1	Integrated Circuit, Quad OP-AMP	2	MC3403P	04713	
U2	Same as U1				
U3	Integrated Circuit, Dual OP-AMP	1	MC1458N	18324	

5.5.3.2 **Type 796501-2 Input Filter/21.4 MHz Marker** REF DESIG PREFIX A3A2

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
	Revision A				
C1	Capacitor, Variable, Ceramic: 2.5-11 pF, 350 V	1	538-006-B2.5-11	59660	
C2	Capacitor, Ceramic, Monolithic: 33 pF, ±2%, 100 V	2	150-100-NPO-330G	51642	
C3	Same as C2				
C4	Capacitor, Ceramic, Disc: .01 µF, ±20%, 50 V	6	34453-1	14632	
C5	Capacitor, Ceramic, Monolithic: 1.0 pF, ±.1%, ±100 V	1	100-100-NPO-109B	51642	
C6 Thru C10	Same as C4				
C11	Capacitor, Ceramic, Monolithic: 150 pF, ±2%, ±100 V	2	150-100-NPO-151G	51642	
C12	Capacitor, Ceramic, Monolithic: 240 pF, ±2%, ±100 V	2	150-100-NPO-241G	51642	
C13	Capacitor, Ceramic, Monolithic: 270 pF, ±2%, ±100 V	1	150-100-NPO-271G	51642	
C14	Same as C12				
C15	Same as C11				
E1	Terminal	5	TSW-101-07-G-S	55322	
E2 Thru E5	Same as E1				
L1	Inductor	2	L10-0R464	7W259	
L2	Inductor	2	L10-0R487	7W259	
L3	Same as L2				
L4	Same as L1				
Q1	Transistor	1	2N2857	80131	
Q2	Transistor	2	U310	17856	
Q3	Same as Q2				
R1	Resistor, Fixed, Film: 47 Ω, 5%, 1/4 W	4	CF1/4-47 OHMS/J	09021	
R2	Resistor, Fixed, Film: 220 kΩ, 5%, 1/4 W	1	CF1/4-220 K/J	09021	
R3	Resistor, Fixed, Film: 47 kΩ, 5%, 1/4 W	2	CF1/4-47 K/J	09021	
R4	Same as R1				
R5	Same as R3				
R6	Resistor, Fixed, Film: 1.2 kΩ, 5%, 1/4 W	2	CF1/4-1.2 K/J	09021	
R7	Same as R1				
R8	Same as R6				
R9	Resistor, Trimmer, Film: 200 Ω, 10%, 1/2 W	1	62PAR200	73138	
R10	Same as R1				
R11	Resistor, Fixed, Film: 270 Ω, 5%, 1/4 W	1	CF1/4-270 OHMS/J	09021	
T1	Transformer	1	T9-1	15542	
Y1	Crystal, Quartz: 21.4 MHz	1	96402-1	14632	

5.5.3.3 **Type 796502-1 VCO First Converter** REF DESIG PREFIX A3A3

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
	Revision B				
C1	Capacitor, Electrolytic, Tantalum: 18 µF, 10%, 20 V	3	196D186X9020DE3	56289	
C2	Capacitor, Ceramic, Disc: .01 µF, 20%, 50 V	1	34453-1	14632	
C3	Same as C1				
C4	Capacitor, Ceramic, Monolithic: 1000 pF, ±2%, 100 V	9	150-100-NPO-102G	51642	
C5	Same as C1				
C6	Same as C4				
C7	Capacitor, Ceramic, Chip: 470 pF, 10%, 200 V	1	ATC100B471KP200X	29990	
C8	Capacitor, Ceramic, Chip: 27.0 pF, ±2%, 500 V	2	ATC100B270GP500X	29990	
C9	Capacitor, Variable, Air: 0.6-6 pF, 250 V	1	5701	91293	
C10	Same as C8				
C11	Capacitor, Ceramic, Chip: 15 pF, 2%, 500 V	1	ATC100B150GP500X	29990	
C12	Capacitor, Ceramic, Chip: 4.7 pF, ±.25 pF, 500 V	1	ATC100B4R7CP500X	29990	
C13	Capacitor, Electroyltic, Tantalum: 4.7 µF, 20% 35 V	3	196D475X0035JE3	56289	
C14 Thru C16	Same as C4				
C17	Same as C13				
C18 Thru C20	Same as C4				
C21	Same as C13				
C22	Same as C4				
C23	Capacitor, Ceramic, Disc: 1 µF, 20%, 50 V	1	34475-1	14632	
CR1	Diode	2	1N4449	80131	
CR2	Same as CR1				
CR3	Diode, Varicap	1	KV3901	52673	
E1	Terminal	5	TSW-101-07-G-S	55322	
E2 Thru E5	Same as E1				
L1	Coil, Fixed: 2.2 µH, 10%	3	1025-28	99800	
L2	Same as L1				
L3	Same as L1				
Q1	Transistor	2	2N3904	80131	
Q2	Same as Q1				
Q3	Transistor	1	U310	17856	
R1	Resistor, Fixed, Film: 10 Ω, 5%, 1/4 W	6	CF1/4-10 OHMS/J	09021	
R2	Resistor, Fixed, Film: 2.7 kΩ, 5%, 1/4 W	1	CF1/4-2.7 K/J	09021	
R3	Resistor, Fixed, Film: 3.3 Ω, 5%, 1/4 W	1	CF1/4-3.3 OHMS/J	09021	
R4	Resistor, Fixed, Film: 5.11 kΩ, 1%, 1/10 W	1	RN55C5111F	81349	
R5	Resistor, Fixed, Film: 7.5 kΩ, 1%, 1/10 W	1	RN55C7501F	81349	
R6	Resistor, Fixed, Film: 27 kΩ, 5%, 1/4 W	1	CF1/4-27 K/J	09021	

5.5.3.2 **Type 796501-2 Input Filter/21.4 MHz Marker** REF DESIG PREFIX A3A2

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
	Revision A				
C1	Capacitor, Variable, Ceramic: 2.5-11 pF, 350 V	1	538-006-B2.5-11	59660	
C2	Capacitor, Ceramic, Monolithic: 33 pF, ±2%, 100 V	2	150-100-NPO-330G	51642	
C3	Same as C2				
C4	Capacitor, Ceramic, Disc: .01 µF, ±20%, 50 V	6	34453-1	14632	
C5	Capacitor, Ceramic, Monolithic: 1.0 pF, ±.1%, ±100 V	1	100-100-NPO-109B	51642	
C6 Thru C10	Same as C4				
C11	Capacitor, Ceramic, Monolithic: 150 pF, ±2%, ±100 V	2	150-100-NPO-151G	51642	
C12	Capacitor, Ceramic, Monolithic: 240 pF, ±2%, ±100 V	2	150-100-NPO-241G	51642	
C13	Capacitor, Ceramic, Monolithic: 270 pF, ±2%, ±100 V	1	150-100-NPO-271G	51642	
C14	Same as C12				
C15	Same as C11				
E1	Terminal	5	TSW-101-07-G-S	55322	
E2 Thru E5	Same as E1				
L1	Inductor	2	L10-0R464	7W259	
L2	Inductor	2	L10-0R487	7W259	
L3	Same as L2				
L4	Same as L1				
Q1	Transistor	1	2N2857	80131	
Q2	Transistor	2	U310	17856	
Q3	Same as Q2				
R1	Resistor, Fixed, Film: 47 Ω, 5%, 1/4 W	4	CF1/4-47 OHMS/J	09021	
R2	Resistor, Fixed, Film: 220 kΩ, 5%, 1/4 W	1	CF1/4-220 K/J	09021	
R3	Resistor, Fixed, Film: 47 kΩ, 5%, 1/4 W	2	CF1/4-47 K/J	09021	
R4	Same as R1				
R5	Same as R3				
R6	Resistor, Fixed, Film: 1.2 kΩ, 5%, 1/4 W	2	CF1/4-1.2 K/J	09021	
R7	Same as R1				
R8	Same as R6				
R9	Resistor, Trimmer, Film: 200 Ω, 10%, 1/2 W	1	62PAR200	73138	
R10	Same as R1				
R11	Resistor, Fixed, Film: 270 Ω, 5%, 1/4 W	1	CF1/4-270 OHMS/J	09021	
T1	Transformer	1	T9-1	15542	
Y1	Crystal, Quartz: 21.4 MHz	1	96402-1	14632	

5.5.3.3 **Type 796502-1 VCO First Converter** REF DESIG PREFIX A3A3

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
	Revision B				
C1	Capacitor, Electrolytic, Tantalum: 18 µF, 10%, 20 V	3	196D186X9020DE3	56289	
C2	Capacitor, Ceramic, Disc: .01 µF, 20%, 50 V	1	34453-1	14632	
C3	Same as C1				
C4	Capacitor, Ceramic, Monolithic: 1000 pF, ±2%, 100 V	9	150-100-NPO-102G	51642	
C5	Same as C1				
C6	Same as C4				
C7	Capacitor, Ceramic, Chip: 470 pF, 10%, 200 V	1	ATC100B471KP200X	29990	
C8	Capacitor, Ceramic, Chip: 27.0 pF, ±2%, 500 V	2	ATC100B270GP500X	29990	
C9	Capacitor, Variable, Air: 0.6-6 pF, 250 V	1	5701	91293	
C10	Same as C8				
C11	Capacitor, Ceramic, Chip: 15 pF, 2%, 500 V	1	ATC100B150GP500X	29990	
C12	Capacitor, Ceramic, Chip: 4.7 pF, ±.25 pF, 500 V	1	ATC100B4R7CP500X	29990	
C13	Capacitor, Electroyltic, Tantalum: 4.7 µF, 20% 35 V	3	196D475X0035JE3	56289	
C14 Thru C16	Same as C4				
C17	Same as C13				
C18 Thru C20	Same as C4				
C21	Same as C13				
C22	Same as C4				
C23	Capacitor, Ceramic, Disc: 1 µF, 20%, 50 V	1	34475-1	14632	
CR1	Diode	2	1N4449	80131	
CR2	Same as CR1				
CR3	Diode, Varicap	1	KV3901	52673	
E1	Terminal	5	TSW-101-07-G-S	55322	
E2 Thru E5	Same as E1				
L1	Coil, Fixed: 2.2 µH, 10%	3	1025-28	99800	
L2	Same as L1				
L3	Same as L1				
Q1	Transistor	2	2N3904	80131	
Q2	Same as Q1				
Q3	Transistor	1	U310	17856	
R1	Resistor, Fixed, Film: 10 Ω, 5%, 1/4 W	6	CF1/4-10 OHMS/J	09021	
R2	Resistor, Fixed, Film: 2.7 kΩ, 5%, 1/4 W	1	CF1/4-2.7 K/J	09021	
R3	Resistor, Fixed, Film: 3.3 Ω, 5%, 1/4 W	1	CF1/4-3.3 OHMS/J	09021	
R4	Resistor, Fixed, Film: 5.11 kΩ, 1%, 1/10 W	1	RN55C5111F	81349	
R5	Resistor, Fixed, Film: 7.5 kΩ, 1%, 1/10 W	1	RN55C7501F	81349	
R6	Resistor, Fixed, Film: 27 kΩ, 5%, 1/4 W	1	CF1/4-27 K/J	09021	

REF DESIG PREFIX **A3A3**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
R7	Resistor, Fixed, Film: 10 kΩ, 5%, 1/4 W	2	CF1/4-10 K/J	09021	
R8	Resistor, Fixed, Film: 27 kΩ, 5%, 1/4 W	4	CF1/4-27 K/J	09021	
R9	Resistor, Trimmer, Film: 10 kΩ, 10%, 1/2 W	2	62PAR10K	73138	
R10	Resistor, Fixed, Film: 1 kΩ, 5%, 1/4 W	1	CF1/4-1 K/J	09021	
R11	Same as R9				
R12 Thru R14	Same as R8				
R15	Resistor, Trimmer, Film: 200 kΩ, 10%, 1/2 W	2	62PAR200K	73138	
R16	Same as R15				
R17	Same as R7				
R18	Same as R1				
R19	Resistor, Fixed, Film: 220 Ω, 5%, 1/4 W	1	CF1/4-220 OHMS/J	09021	
R20	Resistor, Fixed, Film: 68 Ω, 5%, 1/4 W	1	CF1/4-68 OHMS/J	09021	
R21 Thru R23	Same as R1				
R24	Resistor, Fixed, Film: 47 Ω, 5%, 1/4 W	2	CF1/4-47 OHMS/J	09021	
R25	Same as R24				
R26	Resistor, Fixed, Film: 300 Ω, 5%, 1/4 W	4	CF1/4-300 OHMS/J	09021	
R27	Same as R26				
R28	Resistor, Fixed, Film: 18 Ω, 5%, 1/4 W	2	CF1/4-18 OHMS/J	09021	
R29	Same as R1				
R30	Same as R26				
R31	Same as R28				
R32	Same as R26				
T1	Transformer	2	T2-1T	15542	
T2	Same as T1				
U1	Integrated Circuit, Voltage Regulator	1	723DC	07263	
U2	Integrated Circuit, RF Amplifier	1	MWA120	04713	
U3	Amplifier, RF	2	MWA130	04713	
U4	Same as U3				
U5	Mixer, Balanced	1	TAK-3H	15542	
U6	Amplifier	1	QBH-137	55027	
W1	Wire	1	281213-2	14632	
Z1	Delay Line	1	281212-1	14632	

5.5.3.4 **Type 796504-1 Second LO/Converter** REF DESIG PREFIX **A3A4**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
	Revision C				
C1	Not Used				
C2	Capacitor, Electrolytic, Tantalum: 4.7 µF, 20%, 35 V	3	196D475X0035JE3	56289	
C3	Capacitor, Ceramic, Monolithic: 1000 pF, ±2%, 100 V	7	150-100-NPO-102G	51642	
C4	Capacitor, Ceramic, Monolithic: 27 pF, ±2%, 100 V	1	150-100-NPO-270G	51642	
C5	Capacitor, Ceramic, Monolithic: 68 pF, ±2%, 100 V	1	150-100-NPO-680G	51642	
C6	Capacitor, Ceramic, Monolithic: 100 pF, ±2%, 100 V	1	200-100-NPO-101G	51642	
C7	Capacitor, Ceramic, Monolithic: 15 pF, ±2%, 100 V	2	100-100-NPO-150G	51642	
C8	Capacitor, Ceramic, Monolithic: 47 pF, ±2%, 100 V	1	150-100-NPO-470G	51642	
C9	Same as C7				
C10	Same as C2				
C11 Thru C13	Same as C3				
C14	Same as C2				
C15 Thru C17	Same as C3				
E1	Terminal	4	TSW-101-07-G-S	55322	
E2 Thru E4	Same as E1				
FB1	Balun	1	281179-1	14632	
L1	Coil, Variable: 0.135-0.165 µH	1	558-7107-03	71279	
L2	Coil, Fixed, Mold: .1 µH	2	1025-94	99800	
L3	Same as L2				
Q1	Transistor	1	U310	17856	
R1	Resistor, Fixed, Film: 47 Ω, 5%, 1/4 W	3	CF1/4-47 OHMS/J	09021	
R2	Resistor, Fixed, Film: 10 Ω, 5%, 1/4 W	4	CF1/4-10 OHMS/J	09021	
R3	Resistor, Fixed, Film: 220 Ω, 5%, 1/4 W	1	CF1/4-220 OHMS/J	09021	
R4	Resistor, Fixed, Film: 300 Ω, 5%, 1/4 W	4	CF1/4-300 OHMS/J	09021	
R5	Resistor, Fixed, Film: 18 Ω, 5%, 1/4 W	2	CF1/4-18 OHMS/J	09021	
R6	Same as R4				
R7	Resistor, Fixed, Film: 68 Ω, 5%, 1/4 W	1	CF1/4-68 OHMS/J	09021	
R8	Same as R2				
R9	Same as R1				
R10	Same as R1				
R11	Same as R2				
R12	Same as R2				
R13	Same as R4				
R14	Same as R5				
R15	Same as R4				
T1	Transformer	2	T2-1T	15542	

REF DESIG PREFIX **A3A4**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
T2	Same as T1				
U1	Integrated Circuit, RF Amplifier	1	MWA120	04713	
U2	Amplifier, RF	2	MWA130	04713	
U3	Same as U2				
U4	Mixer, Balanced	1	TAK-3H	15542	
W1	Wire	1	281213-1	14632	
Y1	Crystal/Quartz: 86 MHz	1	CR56/U 86.000 MHz	80058	

5.5.3.5 **Type 796614-1 Second IF Assembly** REF DESIG PREFIX A3A5

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
	Revision A				
C1	Capacitor, Ceramic, Monolithic: 27 pF, ±2%, 100 V	1	150-100-NPO-270G	51642	
C2	Capacitor, Ceramic, Monolithic: 6.8 pF, ±.25%, 100 V	2	100-100-NPO-689C	51642	
C3	Same as C2				
C4	Capacitor, Ceramic, Monolithic: 24 pF, ±2%, 100 V	1	150-100-NPO-240G	51642	
C5	Capacitor, Electrolytic, Tantalum: 4.7 µF, 20%, 35 V	1	196D475X0035JE3	56289	
C6	Capacitor, Ceramic, Disc: .01 µF, 20%, 50 V	3	34453-1	14632	
C7	Same as C6				
C8	Capacitor, Ceramic, Monolithic: 20 pF, ±2%, 100 V	1	100-100-NPO-200G	51642	
C9	Capacitor, Ceramic, Monolithic: 15 pF, ±2%, 100 V	2	100-100-NPO-150G	51642	
C10	Same as C6				
C11	Capacitor, Ceramic, Monolithic: 22 pF, ±5%, 100 V	1	100-100-NPO-220J	51642	
C12	Same as C6				
E1	Terminal	4	TSW-101-07-G-S	55322	
E2 Thru E4	Same as E1				
FL1	Filter/Crystal	2	5261/UMB	25120	
FL2	Same as FL1				
L1	Coil, Fixed, Molded: 15 µH, 10%	2	1025-48	99800	
L2	Coil, Variable: 5.04-6.16 µH	4	558-7107-22	71279	
L3	Same as L2				
L4	Same as L1				
L5	Same as L2				
L6	Same as L2				
R1	Resistor, Fixed, Film: 300 Ω, 5%, 1/4 W	2	CF1/4-300 OHMS/J	09021	
R2	Resistor, Fixed, Film: 18 Ω, 5%, 1/4 W	1	CF1/4-18 OHMS/J	09021	
R3	Same as R1				
R4	Resistor, Fixed, Film: 750 Ω, 5%, 1/4 W	1	CF1/4-750 OHMS/J	09021	
R5	Resistor, Fixed, Film: 270 Ω, 5%, 1/4 W	1	CF1/4-270 OHMS/J	09021	
R6	Resistor, Fixed, Film: 150 Ω, 5%, 1/4 W	1	CF1/4-150 OHMS/J	09021	
U1	Integrated Circuit, RF Amplifier	1	MWA110	04713	
U2	Amplifier	1	MWA-220	04713	

5.5.3.6 **Type 796506-2 Log IF/Detector** REF DESIG PREFIX **A3A6**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
	Revision E				
C1	Capacitor, Ceramic, Disc: 0.1 µF, 20%, 50 V	15	34453-1	14632	
C2	Capacitor, Ceramic, Monolithic: 150 pF, ±2%, 100 V	1	150-100-NPO-151G	51642	
C3	Capacitor, Ceramic, Monolithic: 360 pF, ±2%, 100 V	1	150-100-NPO-361G	51642	
C4	Same as C1				
C5	Capacitor, Ceramic, Monolithic: 75 pF, ±2%, 100 V	1	200-100-NPO-750G	51642	
C6 Thru C9	Same as C1				
C10	Capacitor, Electrolytic, Tantalum: 4.7 µF, 20%, 35 V	8	196D475X0035JE3	56289	
C11	Capacitor, Ceramic, Disc: .022 µF, 10%, 100 V	7	CK06BX223K	81349	
C12	Same as C1				
C13	Capacitor, Ceramic, Monolithic: 120 pF, ±2%, 100 V	2	200-100-NPO-121G	51642	
C14	Same as C1				
C15	Same as C11				
C16	Same as C1				
C17	Same as C11				
C18	Same as C1				
C19	Same as C10				
C20	Same as C11				
C21	Same as C1				
C22	Same as C13				
C23	Same as C1				
C24	Same as C11				
C25	Same as C1				
C26	Same as C10				
C27	Same as C11				
C28	Same as C1				
C29	Same as C11				
C30	Same as C1				
C31	Capacitor, Ceramic, Monolithic: 1500 pF, ±2%, 100 V	2	150-100-NPO-152G	51642	
C32	Same as C31				
C33	Same as C10				
C34	Same as C10				
C35	Capacitor, Ceramic, Monolithic: 1000 pF, ±2%, 100 V	1	150-100-NPO-102G	51642	
C36 Thru C38	Same as C10				
CR1	Diode	1	IN4449	80131	
E1	Terminal	8	TSW-101-07-G-S	55322	
E2 Thru E8	Same as E1				

REF DESIG PREFIX **A3A6**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
L1	Coil, Fixed, Molded: 0.82 µH, 10%	1	1025-18	99800	
L2	Coil, Fixed: 0.39 µH, 10%	1	1025-10	99800	
L3	Coil, Variable: 2.43-2.97 µH	1	558-7107-18	71279	
L4	Coil, Fixed: 18 µH, 10%	3	1025-50	99800	
L5	Same as L4				
L6	Coil, Variable: 1.98-2.42 µH	2	558-7107-17	71279	
L7	Same as L4				
L8	Same as L6				
Q1	Transistor	1	U310	17856	
Q2	Transistor	1	2N2102	80131	
RA1	Heat Sink	1	2225B	13103	
R1	Resistor, Fixed, Film: 1.5 kΩ, 5%, 1/4 W	3	CF1/4-1.5 K/J	09021	
R2	Resistor, Variable, Film: 200Ω, 10%, 1/2 W	1	62PAR200	73138	
R3	Resistor, Fixed, Film: 100Ω, 5%, 1/4 W	2	CF1/4-100 OHMS/J	09021	
R4	Resistor, Fixed, Film: 10Ω, 5%, 1/4 W	8	CF1/4-10 OHMS/J	09021	
R5	Resistor, Fixed, Film: 1.0 kΩ, 5%, 1/4 W	7	CF1/4-1 K/J	09021	
R6	Same as R1				
R7	Same as R4				
R8	Same as R5				
R9	Resistor, Fixed, Film: 47Ω, 5%, 1/4 W	4	CF1/4-47 OHMS/J	09021	
R10	Same as R4				
R11	Same as R5				
R12	Same as R9				
R13	Same as R4				
R14	Same as R5				
R15	Same as R1				
R16	Same as R4				
R17	Same as R5				
R18	Same as R9				
R19	Same as R4				
R20	Same as R5				
R21	Same as R9				
R22	Same as R4				
R23	Same as R5				
R24	Resistor, Fixed, Film: 4.7 kΩ, 5%, 1/4 W	2	CF1/4-4.7 K/J	09021	
R25	Same as R3				
R26	Resistor, Fixed, Film: 10 kΩ, 5%, 1/10 W	2	RN55C1002F	81349	
R27	Same as R26				
R28	Resistor, Fixed, Film: 18.2 kΩ, 1%, 1/10 W	2	RN55C1822F	81349	
R29	Same as R28				
R30	Resistor, Trimmer, Film: 10 kΩ, 10%, 1/2 W	1	62PAR10K	73138	
R31	Resistor, Fixed, Film: 10 kΩ, 5%, 1/4 W	1	CF1/4-10 K/J	09021	

REF DESIG PREFIX **A3A6**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
A32	Resistor, Fixed, Film: 51Ω, 5%, 1/4 W	1	CF1/4-51 K/J	09021	
R33	Resistor, Fixed, Film: 5.1 kΩ, 5%, 1/4 W	1	CF1/4-5.1 K/J	09021	
R34	Resistor, Trimmer, Film: 10Ω, 10%, 1/2 W	1	62PAR100	73138	
R35	Same as R24				
R36	Resistor, Fixed, Film: 100 kΩ, 5%, 1/4 W	2	CF1/4-100 K/J	09021	
R37	Same as R36				
R38	Resistor, Fixed, Film: 620Ω, 5%, 1/4 W	1	CF1/4-620 OHMS/J	09021	
R39	Resistor, Fixed, Film: 100 kΩ, 1%, 1/10 W	1	RN55C1003F	81349	
R40	Resistor, Fixed, Film: 232Ω, 1%, 1/10 W	1	RN55C2320F	81349	
R41	Resistor, Fixed, Film: 402 kΩ, 1%, 1/10 W	1	RN55C4023F	81349	
R42	Not Used				
R43	Resistor, Fixed, Film: 2.0 kΩ, 1%, 1/10 W	1	RN55C2001F	81349	
R44	Resistor, Fixed, Film: 12.1 kΩ, 1%, 1/10 W	1	RN55C1212F	81349	
R45	Resistor, Fixed, Film: 2.7Ω, 5%, 1/4 W	2	CF1/4-2.7 OHMS/J	09021	
R46	Same as R45				
R47	Same as R4				
U1	Integrated Circuit, Wideband Amplifier	7	SL521C/CM	52648	
U2 Thru U7	Same as U1				
U8	Integrated Circuit, Op Amp	2	TL082ACP	81295	
U9	Same as U8				
U10	Integrated Circuit, Voltage Regulator	1	MC1723CP	04713	

5.5.3.7 **Type 380876-1 Interface Circuit** REF DESIG PREFIX A3A7

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
	Revision A				
J1	Connector, Receptacle: 3 Pin	1	65532-203	22526	
J2	Connector, Paddle Board, 34 Pin	1	111037-7	00779	
P1	Connector, Plug, Multipin, 34 Position	1	609-3401M	15912	

5.5.4 TYPE 796799-1 HIGH VOLTAGE POWER SUPPLY/VIDEO

REF DESIG PREFIX A4

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
	Revision B1				
A1	High Voltage Power Supply/Deflection	1	796507-1	14632	
P1	Socket, CRT: 14 Pin	1	97-09-052	72825	
V1	Tube, CRT, Gradicule Marking	1	481445-1	14632	

5.3.4.1 **Type 796507-1 High Voltage Power Supply/ Deflection Amplifier**

REF DESIG PREFIX A4A1

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
	Revision D				
C1	Capacitor, Electrolytic, Tantalum: 27 µF, 10%, 35 V	7	196D276X9035FE4	56289	
C2 Thru C4	Same as C1				
C5	Capacitor, Electrolytic, Tantalum: 4.7 µF, 20%, 35 V	5	196D475X0035JE3	56289	
C6	Same as C5				
C7	Not Used				
C8	Not Used				
C9	Capacitor, Ceramic, Disc: .1 µF, 20%, 50 V	3	34475-1	14632	
C10	Capacitor, Ceramic, Disc: .01 µF, 20%, 50 V	1	34453-1	14632	
C11	Same as C1				
C12	Same as C1				
C13	Same as C5				
C14	Same as C5				
C15	Not Used				
C16	Not Used				
C17	Same as C1				
C18	Capacitor, Mylar, Dipped: .22 µF, 20%, 400 V	1	719B1MH224PK401S	19701	
C19	Capacitor, Ceramic, Disc: 2200 pF, 20%, 3 K VDC	4	564CZ5UAA302EG222M	56289	
C20 Thru C22	Same as C19				
C23	Capacitor, Ceramic, Disc: .01 µF, 20%, 3 kV	2	30GAS10	56289	
C24	Same as C23				
C25	Capacitor, Ceramic, Monolithic: 4700 pF, ±10%, 100 V	1	8121-100-X7R0-472K	59660	
C26	Same as C9				
C27	Same as C5				
C28	Same as C9				
CR1	Diode	1	1N4449	80131	
CR2	Diode	2	MR851	04713	
CR3	Same as CR2				
CR4	Diode, Rectifier	5	VA30X	83003	
CR5 Thru CR8	Same as CR4				
E1	Terminal, Forked	15	140-1941 02-01	71279	
E2 Thru E12	Same as E1				
J1	Connector	1	609-2607	15912	
L1	Inductor	2	5258	76493	
L2	Same as L1				
P1	Socket, CRT: 14 Pin	1	3B14	71785	
Q1	Transistor	3	2N3904	80131	

REF DESIG PREFIX **A4A1**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
Q2	Transistor	1	TIP30	04713	
Q3	Transistor	2	IRF 822	81483	
Q4	Same as Q3				
Q5	Transistor	4	2N3439	80131	
Q6	Same as Q5				
Q7	Same as Q1				
Q8	Same as Q5				
Q9	Same as Q5				
Q10	Same as Q1				
R1	Resistor, Fixed, Film: 10 kΩ, 5%, 1/4 W	7	CF1/4-10 K/J	09021	
R2	Resistor, Fixed, Film: 10Ω, 5%, 1/4 W	4	CF1/4-10 OHMS/J	09021	
R3	Same as R1				
R4	Same as R1				
R5	Same as R2				
R6	Resistor, Trimmer, Film: 50 kΩ, 10%, 1/2 W	2	62PAR50K	73138	
R7	Same as R6				
R8	Not Used				
R9	Resistor, Fixed, Film: 27 kΩ, 5%, 1/4 W	1	CF1/4-27 K/J	09021	
R10	Not Used				
R11	Resistor, Fixed, Film: 1.0 kΩ, 5%, 1/4 W	4	CF1/4-1 K/J	09021	
R12	Resistor, Fixed, Film: 270Ω, 5%, 1/4 W	1	CF1/4-270 OHMS/J	09021	
R13	Same as R11				
R14	Resistor, Fixed, Film: 3.65 kΩ, 1%, 1/10 W	1	RN55C3651F	81349	
R15	Resistor, Fixed, Film: 22.1Ω, 1%, 1/10 W	1	RN55D22R1F	81349	
R16	Resistor, Fixed, Film: 39 kΩ, 5%, 1/4 W	1	CF1/4-39 K/J	09021	
R17	Resistor, Trimmed, Film: 20 kΩ, 10%, 1/2 W	3	62PAR20K	73138	
R18	Resistor, Fixed, Film: 2.7 MΩ, 5%, 1/4 W	13	CF1/4-2.7 M/J	09021	
R19 Thru R25	Same as R18				
R26	Resistor, Fixed, Film: 22 kΩ, 5%, 1/4 W	1	CF1/4-22 K/J	09021	
R27	Same as R17				
R28	Same as R1				
R29	Resistor, Fixed, Film: 27 kΩ, 5%, 1/4 W	2	CF1/4-27 K/J	09021	
R30	Resistor, Fixed, Film: 47 kΩ, 5%, 1/4 W	3	CF1/4-47 K/J	09021	
R31	Same as R1				
R32	Same as R2				
R33	Not Used				
R34	Same as R17				
R35	Same as R1				
R36	Same as R29				
R37	Resistor, Fixed, Film: 33 kΩ, 5%, 1/4 W	1	CF1/4-33K/J	09021	

REF DESIG PREFIX A4A1

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
R38	Same as R1				
R39	Same as R2				
R40	Resistor, Fixed, Film: 100 kΩ, 5%, 1/4 W	4	CF1/4-100 K/J	09021	
R41	Same as R40				
R42	Resistor, Fixed, Film: 4.75 kΩ, 1%, 1/10 W	4	RN55C4751F	81349	
R43	Same as R42				
R44	Resistor, Fixed, Film: 1.65 kΩ, 1%, 1/10 W	1	RN55C1651F	81349	
R45	Resistor, Fixed, Film: 10 kΩ, 1%, 1/10 W	2	RN55C1002F	81349	
R46	Same as R42				
R47	Resistor, Fixed, Film: 1.82 kΩ, 1%, 1/10 W		RN55C1821	81349	
R48	Same as R45				
R49	Same as R42				
R50	Resistor, Fixed, Film: 3.01 kΩ, 1%, 1/10 W	2	RN55C3011F	81349	
R51	Same as R50				
R52	Same as R40				
R53	Same as R40				
R54	Resistor, Trimmer, Film: 200 kΩ, 10%, 1/2 W	1	62PAR200K	73138	
R55	Resistor, Variable, Composition: 500 kΩ, 10%, 1 W	1	72M1N048S504U	01121	
R56	Same as R18				
R57	Resistor, Variable, Composition: 2.5 MΩ, 10%, 1 W	1	72M1N048S255U	01121	
R58 Thru R61	Same as R18				
R62	Same as R55				
R63	Same as R30				
R64	Resistor, Trimmer, Film: 100 kΩ, 10%, 1/2 W	2	62PAR100K	72138	
R65	Same as R11				
R66	Same as R11				
R68	Same as R30				
R67	Same as R64				
T1	Transformer	1	381029-1	14632	
TP1-3	Same as E1				
U1	Integrated Circuit, Voltage Regulator, 5.0 V	1	LM336Z-5.0	27014	
U2	Integrated Circuit, Op Amp	2	TL082ACP	01295	
U3	Integrated Circuit, Op Amp	1	TL081CP	01295	
U4	Same as U2				
U5	Integrated Circuit, Pulse Modulation	1	SG3526N	04713	

SECTION VI

SCHEMATIC DIAGRAMS

NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   a) CAPACITANCE IS IN μF.
   b) RESISTANCE IS IN OHMS ± 1%, 1/10W.

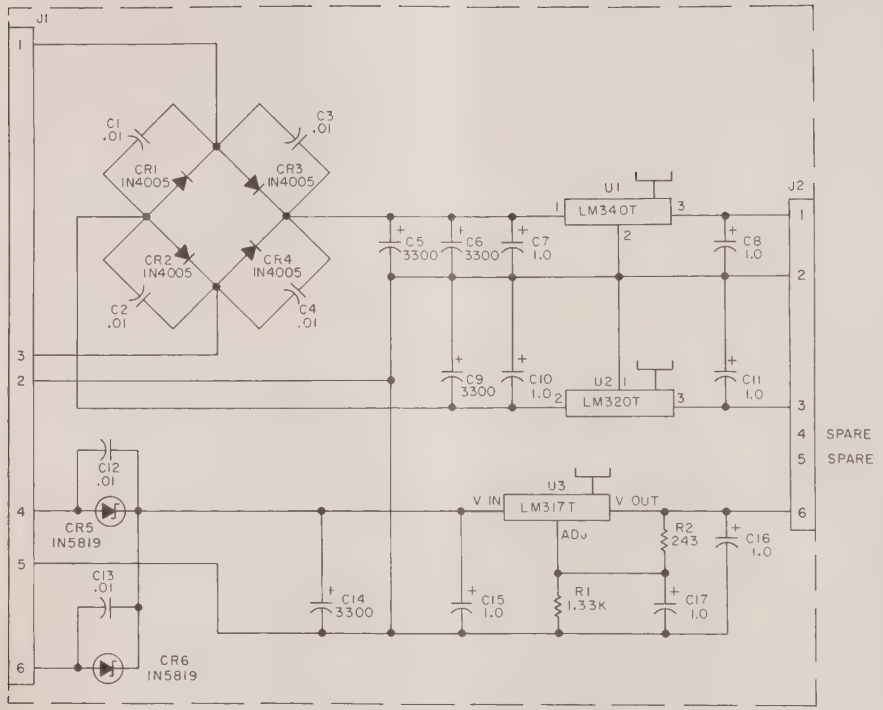


Figure 6-1. Type 796497-1, Power Supply (A1), Schematic Diagram 380899 (C)

NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS IN OHMS, ±5%, 1/4W
   b) CAPACITANCE IS IN µF.
2. ⬚ DENOTES FRONT PANEL CONTROL.
3. SWITCHES S1, S2, S3 ARE VIEWED FROM END OPPOSITE CONTROL KNOB, SHOWN IN EXTREME CCW POSITION.
4. JUMPER A TO B WITH WIRE WRAP CONNECTION IS TO C IS A CUSTOM OPTION TO REVERSE SPECTRUM.
5. DIFFERENCE BETWEEN TYPES IS LISTED IN TABLE.

TYPE	R17	SI RANGE	R24	R33
796498-1	604K	101-5M	10K	6.8K
796498-2	120K	101 8M	6.2K	680

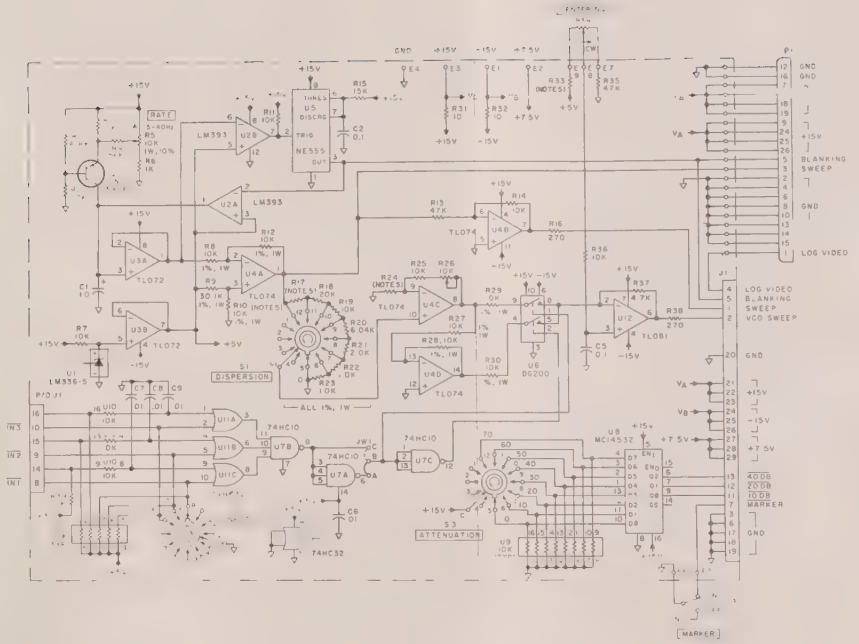


Figure 6-2. Type 796498-1, Sawtooth Generator (A2), Schematic Diagram 580453 (B)

NOTES
1. UNLESS OTHERWISE SPECIFIED
   a) FEEDTHRU CAPACITORS ARE 1000pF
   b) CAPACITANCE IS IN pF
   c) INDUCTANCE IS IN μH
2. DIFFERENCES IN TYPES ARE LISTED IN TABLE A

TABLE A

TYPE	UNIT S/N	A2	A5		A6	A3
796499-1	1 THRU 20	796501-1	796505-1	480757	796506-1	796502-1
796499-2	21 UP	796501-2	796614-1	381197	796506-2	796502-1
796499-3	1 UP	796501-3	796614-1	381197	796506-2	796502-2

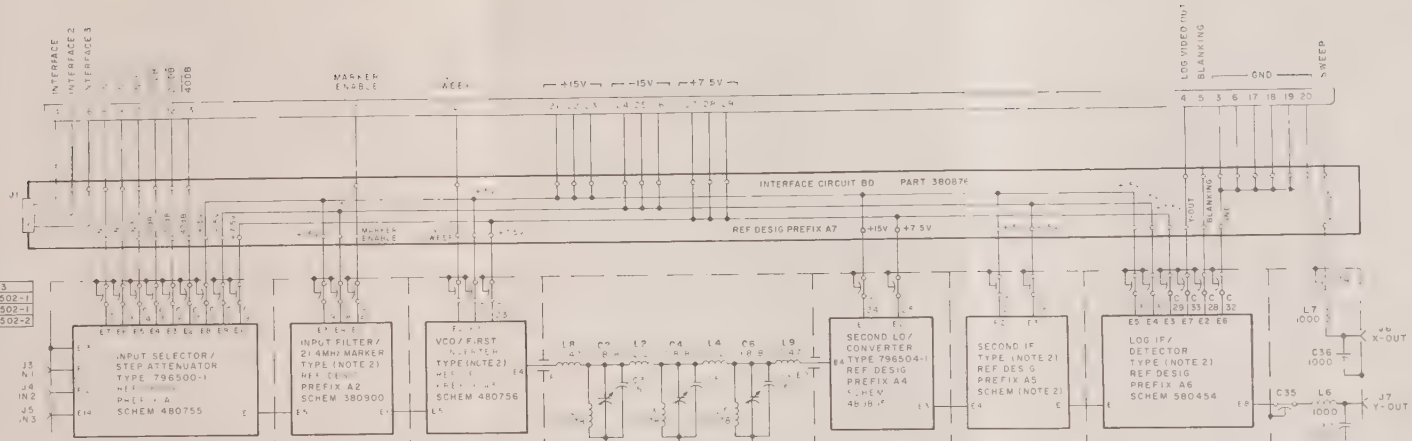


Figure 6-3. Type 796499-2, RF Circuit (A3), Schematic Diagram 480754 (B)

NOTES: UNLESS OTHERWISE SPECIFIED:
1. RESISTANCE IS IN OHMS, ±5%, 1/4W.
2. CAPACITANCE IS IN PF.
3. INDUCTANCE IS IN UH.
4. ALL DIODES ARE KS3542.

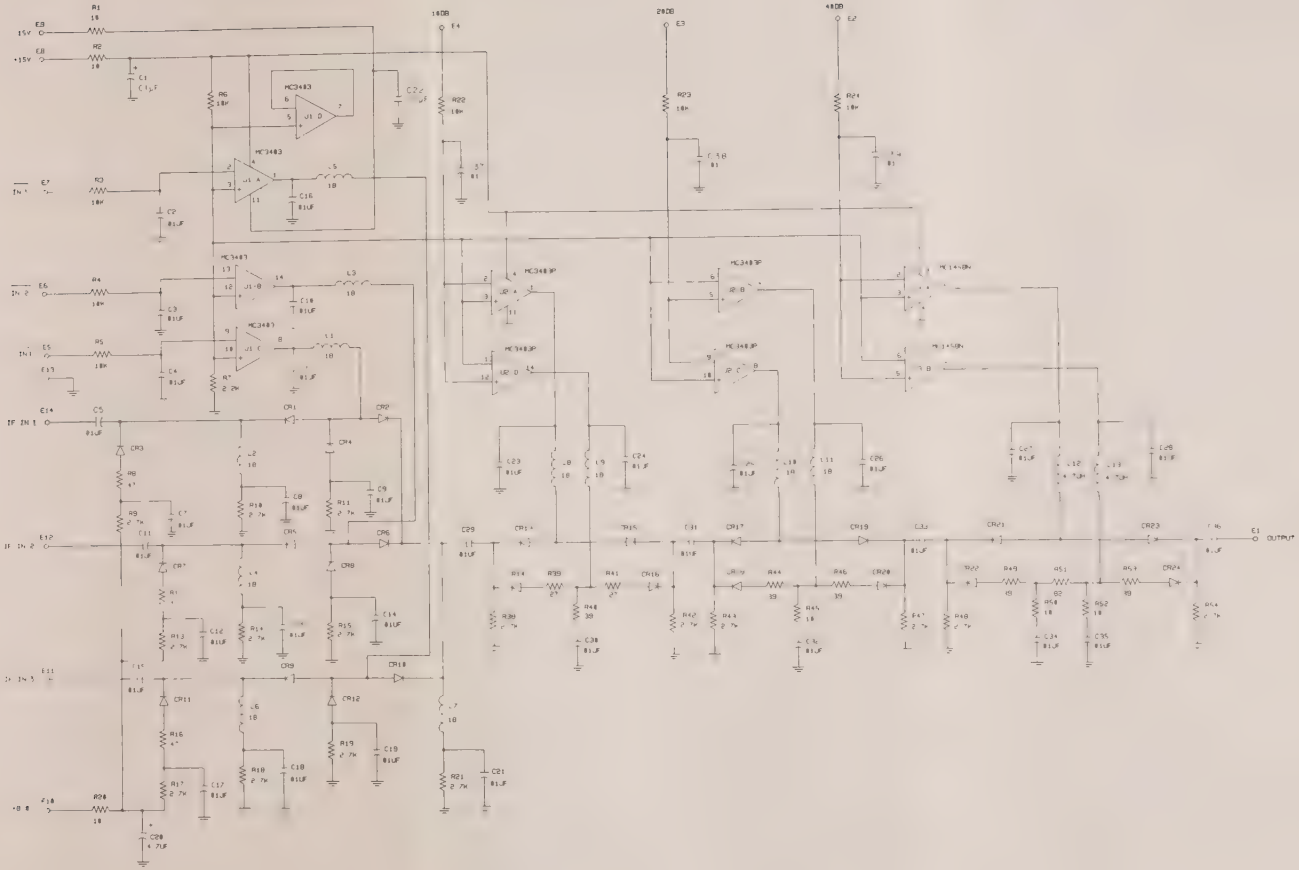


Figure 6-4. Type 796500-1, Input Selector/Step Attenuator (A3A1), Schematic Diagram 480755 (C)

NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   a) CAPACITANCE IS IN pF
   b) INDUCTANCE IS IN μH.
   c) RESISTANCE IS IN OHMS, ±5%, 1/4W.
2. DIFFERENCE BETWEEN TYPES IS LISTED IN TABLE A.

TABLE A

TYPE	R11	C11	C15
796501-1	N/I	150	150
796501-2	USED	150	150
796501-3	USED	100	100

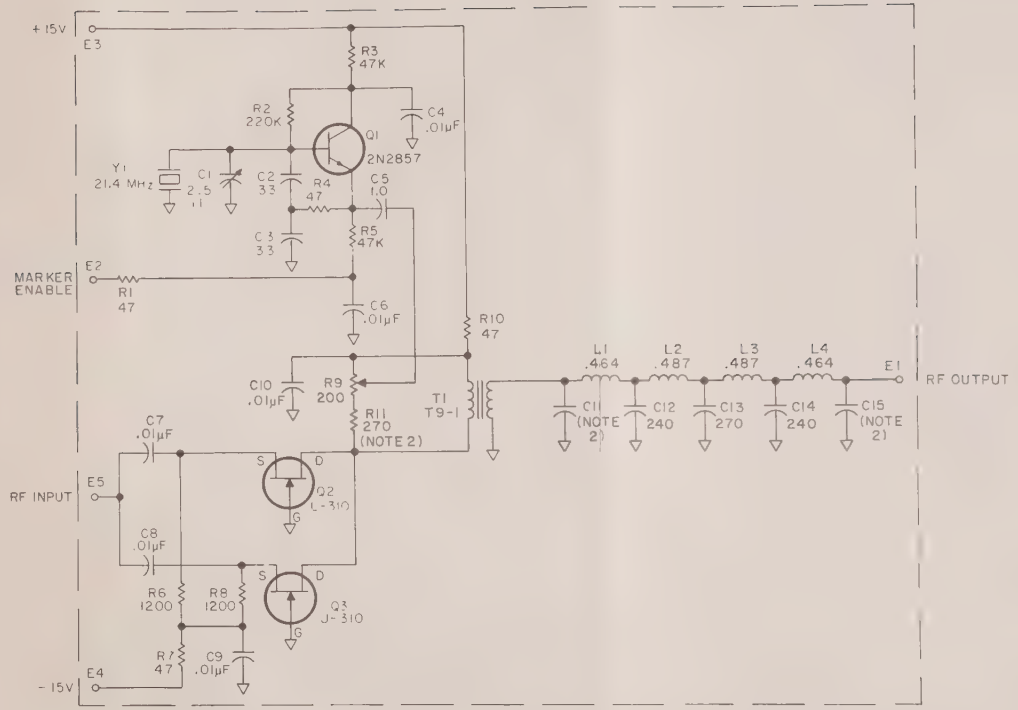


Figure 6-5. Type 796501-2, Input Filter/21.4 MHz Marker (A3A2), Schematic Diagram 380900 (B)

NOTES:
1. UNLESS OTHERWISE SPECIFIED
   a) RESISTANCE IS IN OHMS, ±5%, 1/4W
   b) CAPACITANCE IS IN pF
   c) INDUCTANCE IS IN µH
2. DIFFERENCE BETWEEN TYPES IS LISTED IN TABLE A

TABLE A

TYPE	CR4	C8
796502-1	N/U	27pF
796502-2	KV3901	18pF

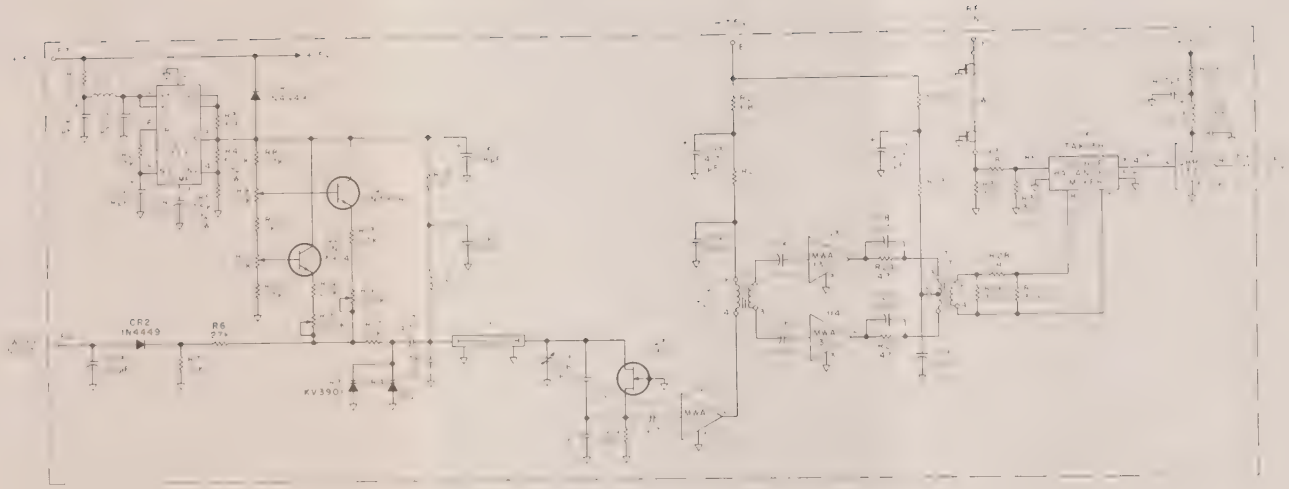


Figure 6-6. Type 796502-1, VCO/First Converter (A3A3), Schematic Diagram 480756 (C)

NOTES:
1. UNLESS OTHERWISE SPECIFIED
   a) RESISTANCE IS IN OHMS, ±5%, 1/4W.
   b) CAPACITANCE IS IN µF.
   c) INDUCTANCE IS IN µH.

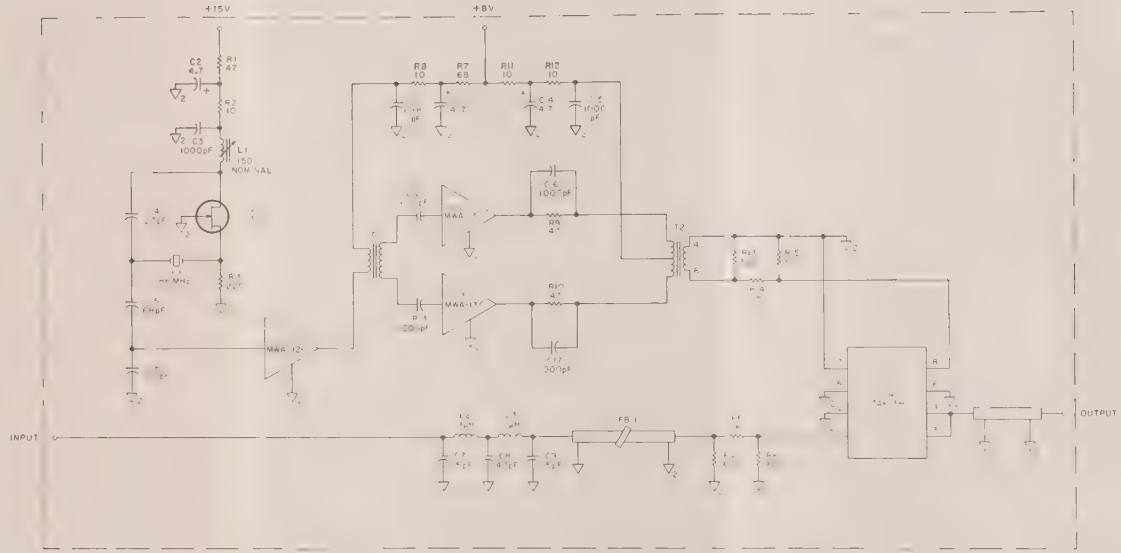


Figure 6-7. Type 796504-1, Second LO/Second Converter (A3A4), Schematic Diagram 480805 (A)

NOTES:
1. UNLESS OTHERWISE INDICATED:
   a) CAPACITANCE IS IN pF.
   b) INDUCTANCE IS IN μH.
   c) RESISTANCE IS IN OHMS, ±5%, 1/4W

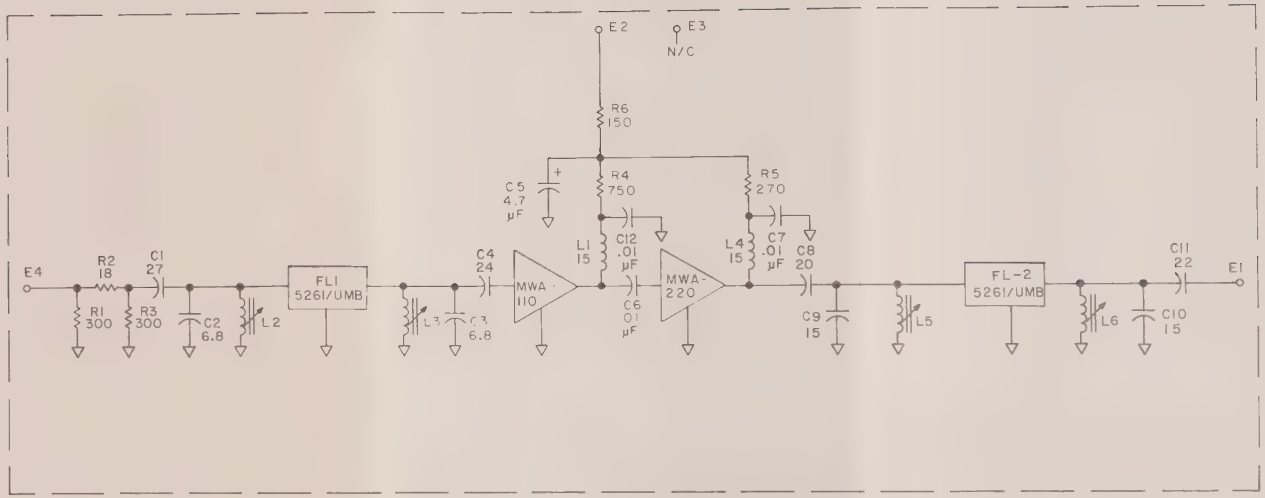


Figure 6-8. Type 796614-1, Second IF (A3A5), Schematic Diagram 381197 (A)

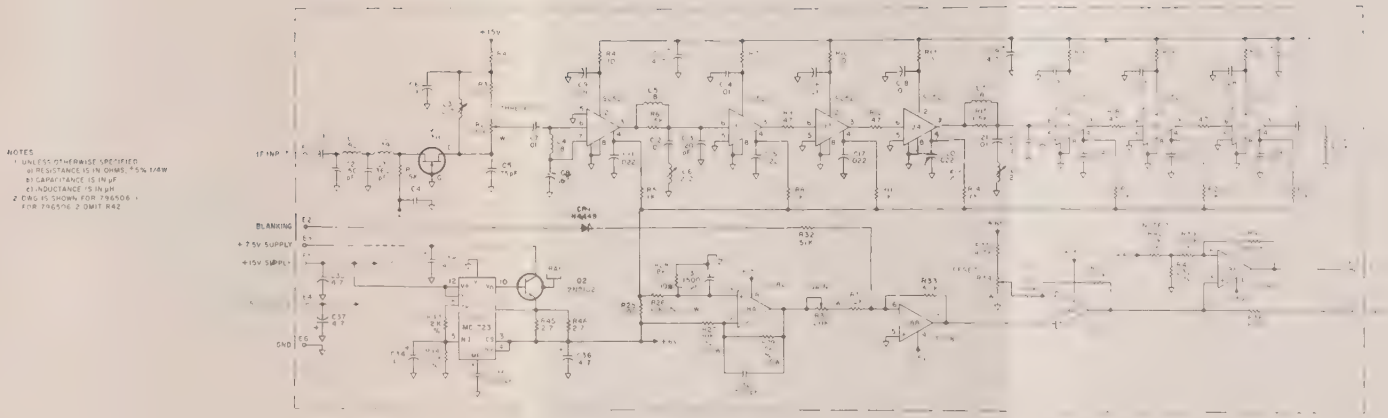


Figure 6-9. Type 796506-2, Log IF/Detector (A3A6), Schematic Diagram 580454 (D)

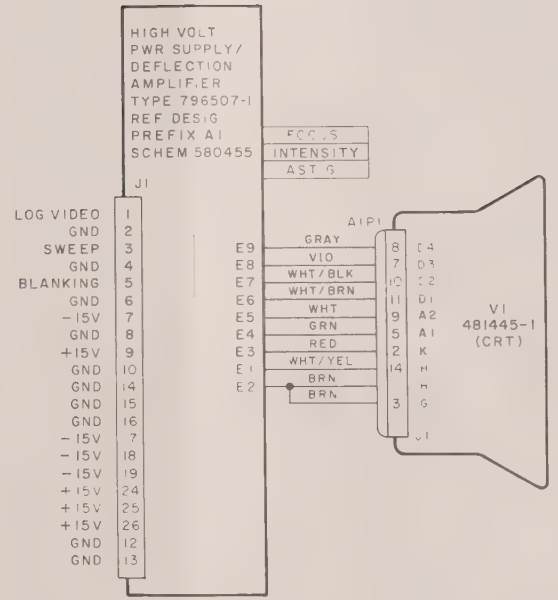


Figure 6-10. Type 796799-1, High Voltage Power Supply/Video (A4), Schematic Diagram 381992 (A)

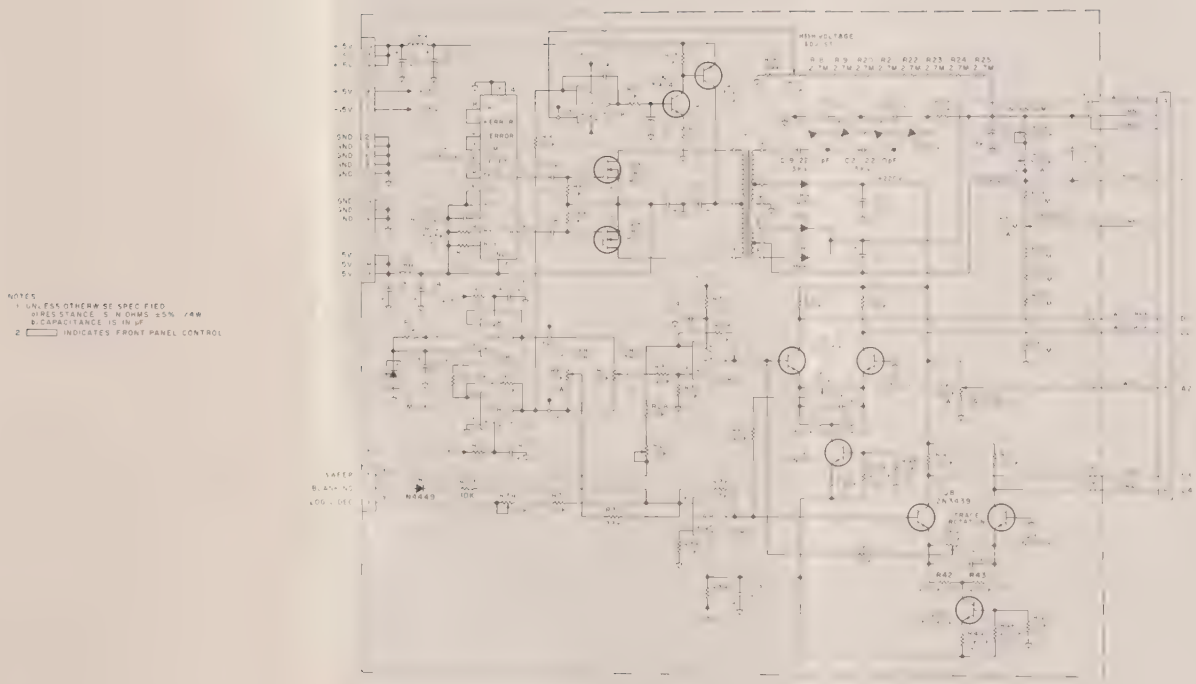


Figure 6-11. Type 796507-1, High Voltage Power Supply/Video (A4A1), Schematic Diagram 580455 (C)

NOTES:
1. ▭ DENOTES FRONT PANEL CONTROL
2. DIFFERENCES IN TYPES IS LISTED IN TABLE A

TABLE A

UNIT S/N	A3	A4
THRU 20	796499-1	796598-1
21 UP	796499-2	796598-2
77 UP	796499-2	796799-1

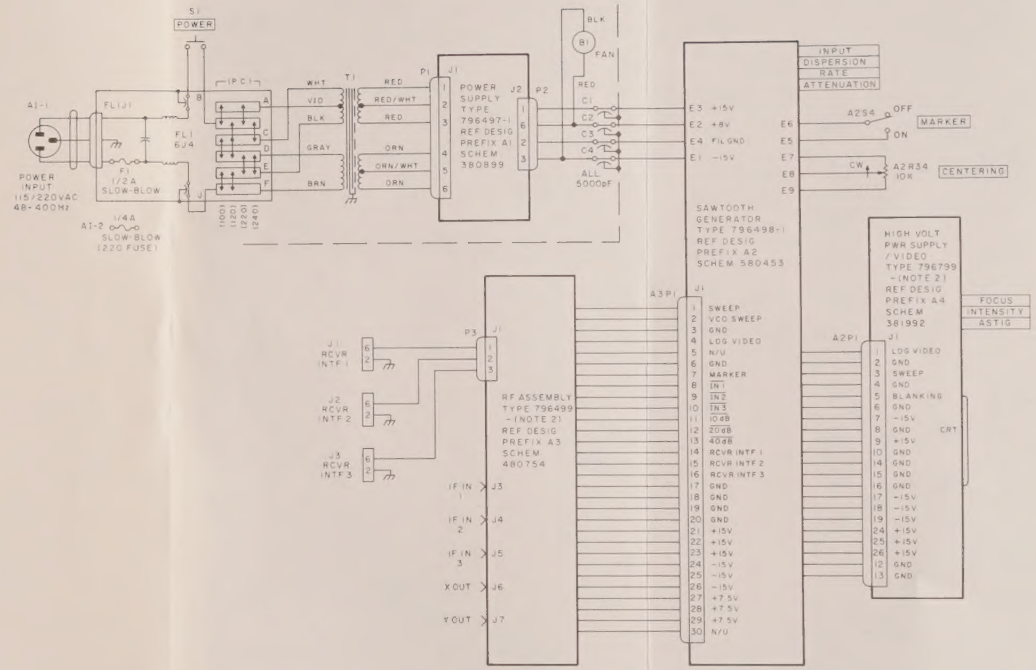


Figure 6-12. Type WJ-9206 Signal Monitor, Main Chassis Schematic Diagram 480752 (E)

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